PHYSICAL DISTRIBUTION PRACTICES AND LOGISTICS PERFORMANCE IN THE KENYAN BREWING INDUSTRY

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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ABSTRACT

Physical distribution practices are fundamental to the operational success of Kenya's brewing industry, as inefficiencies in transportation, warehousing, inventory control, and order processing often result in increased logistics costs and reduced customer satisfaction. This study examined the effect of physical distribution practices on logistics performance in the Kenyan brewing industry. Specifically, it analyzed how transportation management, warehousing management, inventory management, and order processing practices influence logistics performance among major breweries in Kenya. The study was anchored on three theoretical frameworks Bargaining Theory, Resource-Based Theory (RBT), and Agency Theory to provide a conceptual foundation for explaining the relationships between distribution practices and logistics outcomes. A descriptive research design was adopted, targeting 240 employees from logistics, marketing, and management departments in Kenya Breweries Limited, Keroche Breweries, and Summit Breweries. A stratified random sampling technique was used to select 150 respondents, and data were collected through structured questionnaires. Descriptive and inferential statistical analyses, including regression analysis, were performed using SPSS. The findings revealed that transportation management practices had a significant positive effect on delivery reliability and cost efficiency. Warehousing management practices improved order accuracy and product availability. Inventory management practices enhanced responsiveness and reduced stock outs, while effective order processing practices were found to increase customer satisfaction and service dependability. Overall, physical distribution practices collectively explained a substantial portion of the variation in logistics performance within the brewing industry. The study recommends that brewing firms adopt technology-driven distribution systems, implement integrated warehouse and inventory management software, and invest in transport optimization tools to enhance performance. Strengthening interdepartmental coordination and establishing performance-based logistics contracts can further improve efficiency. Enhancing physical distribution practices can ultimately lead to better operational effectiveness, customer satisfaction, and competitive advantage in Kenya's brewing sector.

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ACRONYMS AND ABBREVIATIONS

3PL – Third-party logistics

AI – Artificial Intelligence

EABL – East Africa Breweries Limited

ePOD – electronic Proof of Delivery

ERP – Enterprise Resource Planning systems

GPS – Global Positioning System

I/O – Industrial Organization

ICC – Intraclass Correlation Coefficient

IoT – Internet of Things

JIT – Just in Time

RBT – Resource Based Theory

SGR – Standard Gauge Railway

VRIN – Valuable, Rare, Inimitable, and Non-substitutable

WMS – Warehouse Management System

OPERATIONAL DEFINITION OF TERMS

Physical Distribution Practices: Refer to the activities involved in planning, implementing, and controlling the efficient movement and storage of goods from the point of origin to the point of consumption to meet customer requirements (Christopher, 2016).

Transportation Management Practices: These are strategies and activities aimed at planning, executing, and optimizing the physical movement of goods, including route planning, fleet management, and cost control (Lambert, 2019).

Warehousing Management Practices: Refers to the processes involved in managing storage facilities, including receiving, handling, storing, and dispatching goods in a manner that ensures accuracy and efficiency (Richards, 2021).

Inventory Management Practices: Encompass the systems and techniques used to maintain optimal stock levels, balancing supply and demand while minimizing costs and avoiding stock outs (Waters, 2020).

Order Processing Practices: Denote the procedures involved in receiving, verifying, and fulfilling customer orders accurately and efficiently to ensure timely delivery and customer satisfaction (Bowersox, Closs, & Cooper, 2019).

Logistics Performance: Represents the effectiveness and efficiency of logistics operations in achieving objectives such as timely delivery, cost efficiency, and customer satisfaction (Mentzer & Konrad, 2020).

Brewing Industry: Refers to companies involved in the production, packaging, and distribution of alcoholic and non-alcoholic beer products (Kenya Association of Manufacturers [KAM], 2023).

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In the contemporary, highly competitive, and interconnected global economy, physical distribution practices form the cornerstone of logistics operations, directly influencing customer satisfaction, cost efficiency, and overall logistics performance. These practices encompass the day-to-day handling of finished goods through transportation management, warehousing operations, inventory control, and order processing, ensuring that products move seamlessly from producers to consumers (Christopher, 2022). When effectively executed, these practices reduce delays, enhance delivery reliability, and improve responsiveness across supply chains (Zhao et al., 2021).

Globally, organizations are increasingly relying on data-driven decision-making and digital tools to improve physical distribution performance. For instance, Amazon has transformed order fulfillment through automation, last-mile delivery innovations, and predictive analytics (Ghosh & Shah, 2022). In the United Kingdom, route optimization systems and smart warehouses have improved the speed and reliability of deliveries (Waters & Rinsler, 2021). Similarly, in the United States, investments in AI-powered logistics networks, IoT-enabled tracking, and smart freight corridors have enhanced visibility and adaptability, especially during global disruptions such as the COVID-19 pandemic (Ivanov & Dolgui, 2020). These examples illustrate that efficient physical distribution practices significantly shape logistics outcomes and competitive advantage.

At the regional level, African economies such as South Africa and Nigeria are also navigating modernization and innovation in physical distribution. In South Africa, despite relatively advanced warehousing and transport infrastructure, challenges such as labor strikes and port congestion continue to disrupt logistics performance (Mahlangu & Msimang, 2021). Conversely, Nigeria struggles with urban distribution inefficiencies due to inadequate road networks and high logistics costs. However, digital platforms such as GIG Logistics and Kobo360 have improved last-mile delivery efficiency and real-time tracking (Okeke & Onuoha, 2022). These developments underscore the need for operational and technological improvements to sustain logistics performance in emerging economies.

In Kenya, the physical distribution environment exhibits both progress and persistent challenges. Urbanization, local manufacturing growth, and a rising consumer base have stimulated logistics development. However, inefficiencies in road infrastructure, poorly located warehouses, and unreliable transportation services continue to hinder performance (Mwangi & Kariuki, 2022). Slow truck movements, limited cold storage facilities, and delays in order processing often lead to late deliveries, higher inventory costs, and reduced service reliability. To mitigate these challenges, firms have begun adopting digital order tracking, outsourcing to local couriers, and engaging third-party logistics providers (3PLs) to improve operational efficiency (Omondi & Wanyama, 2023). Additionally, national infrastructure projects such as the Standard Gauge Railway (SGR) and road network expansion have started to alleviate logistical bottlenecks.

Despite growing research interest in supply chain management, most global and local studies have primarily emphasized strategic supply chain models, digital transformation, or general manufacturing logistics, with limited empirical focus on how physical distribution practices specifically influence logistics performance in the Kenyan brewing industry. Existing literature often generalizes findings across industries or examines broad-level strategies while overlooking the operational aspects such as warehousing layout, transport scheduling, order processing speed, and inventory management accuracy that directly affect performance outcomes. This gap creates a lack of sector-specific evidence to guide breweries in optimizing their physical distribution systems.

The Kenyan brewing industry, being a high-volume, time-sensitive, and highly regulated sector, relies heavily on efficient physical distribution to maintain product freshness, delivery accuracy, and customer satisfaction. Yet, there is insufficient empirical understanding of how day-to-day physical distribution practices translate into logistics performance outcomes within this context. Addressing this shortcoming is essential for both academic and practical reasons. Academically, it enriches literature on logistics performance in developing economies. Practically, it provides actionable insights for brewery managers, logistics professionals, and policymakers to improve delivery times, reduce operational costs, and enhance customer service reliability.

Therefore, this study seeks to bridge this knowledge gap by examining the effect of physical distribution practices transportation management, warehousing, inventory management, and order processing on logistics performance in the Kenyan brewing industry. By focusing on operational realities rather than theoretical strategies, the study aims to generate context-specific findings that can inform evidence-based decision-making and contribute to Kenya's broader goal of establishing itself as a competitive logistics hub in East Africa.

1.1.1 Physical Distribution Practices

Physical distribution practices include the duties related to the swift conveyance of completed goods from producers to final consumers in the manner most cost-effective and efficient for them. According to Hazen (2021), physical distribution means the movement, or handling, of products, including transportation, storage, order processing, and inventory management. These practices assist in making the whole logistics operation workable and are significant in ensuring product availability, lessening delivery delays, reducing distribution costs, and enhancing customer satisfaction.

Blakeman (2023) explains distribution success depends on a mixture of planning and successful execution of logistics functions in day-to-day practices, including route planning, warehouse layout optimization, and order filling. Hugos (2024) explains that a well-run distribution system relies upon the clear coordination between producers, distributors, and retailers to ensure the products make it to market in the right place, in a cost-effective manner, and without confusion.

Quote, in order for these companies to remain competitive, the Kenyan brewing industry has to adopt and continuously improve physical distribution practices. Transport practices would include searching for efficient ways to deliver, fleet vehicle management, planning routes and journeys, and management of delivery schedules to improve transit times and costs. Warehousing practices refer to how breweries store their finished goods, the way in which their inventory is organized in their warehouse, and the manner in which they utilize space and technology to ensure products are retrieved and dispatched in a timely manner. Inventory management practices pertain to systematic and real-time monitoring of stock, demand planning and forecasting, and stock rotation methods to avoid stockouts and overstocking that may adversely affect customer satisfaction and operational efficiency. Order processing practices imply how customer orders are received, confirmed, packed and shipped efficiently. Delays in order processing or shipping mistakes may lead to missed sales opportunities and customer dissatisfaction.

In the hectic logistics world of today, it is typical to see the use of digital technologies such as inventory management systems, barcode scanners, and electronic proof of delivery (ePOD) as digital technologies now play a role both in the strategic vision and are part of the daily supply chain practices for improved visibility, traceability, and responsiveness across the distribution process (Ailawadi, 2020).

The ability to implement effective practice of the above practices is critical for the ability for breweries to maintain increased consumer demand, respond to market competition, and sustain logistics performance. This is particularly true in Kenya where infrastructure and logistics systems experience difficulties such as poor road quality, high transport costs, and storage limitations; therefore, improving physical distribution practices is important for a well-functioning supply chain.

1.1.2 Logistics Performance of Brewing industry

Specifically, in the Kenyan brewing industry, logistical performance remains an essential element of business success (Samuel, 2024). In order to ensure product availability, keep prices stable, and improve customer satisfaction, distribution via physical techniques is crucial. Key logistical services covered by these strategies include order processing, inventory control, shipment preservation, and customer support. The entire supply network is directly impacted by how well or poorly these operations perform. Previous research has demonstrated that the distribution of the brewing sector is impacted by a number of variables, including regulatory obstacles, varying demand, and infrastructure constraints. To gain access to wholesalers, retailers, and the end-users, Kenyan breweries mostly depend on conventional distribution networks (Reardon, 2021).

Breweries are turning to third-party logistics (3PL) firms to increase transit efficiency in order to overcome these issues. In order to offer efficient and trustworthy deliveries, particularly to remote areas, various modes of transportation—road, rail, and water—are essential. By cutting lead times and increasing stock availability, intelligent warehouse siting improves inventory management. Integrated inventory systems, GPS tracking, and routing software are examples of innovative technologies that can greatly improve logistics performance and reduce losses. Brewing companies may cut expenses, streamline operations, and focus on product quality and brand development by utilizing 3PL services (Premkumar, 2021). Also, sustainability is gaining importance, which is encouraging breweries to implement environmentally conscious distribution strategies that complement long-term ecological goals.

1.1.3 Brewing Industry

All operations related to the production, packaging, and distribution of beer and other malt-based alcoholic beverages are collectively referred to as the brewing industry. The acquisition of raw materials like barley, maize, and hops, the fermentation and beer-making process, quality assurance, bottle or can packing, and, lastly, the delivery of final goods to retailers, wholesalers, pubs, and customers are all included in this. Support services including marketing, warehousing, logistics, and adherence to tax and health laws are also provided by the industry. The brewery sector faces several obstacles on a global scale. Growing expenses for production, high taxes, fierce rivalry from other types of alcohol like wines and spirits, and shifting consumer habits are a few of these.

Africa's breweries also have facility challenges, especially in countries like South Africa and Nigeria; security concerns, such as cargo theft; and shifting demand brought on by economic pressures (Okoro, 2021; Wambui, 2022). One significant sector of the formal economy in Kenya is the brewing sector. In addition to directly and indirectly creating jobs, it makes a substantial tax contribution to the government. But there are drawbacks as well, like high excise taxes, rivalry with various alcoholic and non-alcoholic beverages, and declining consumer spending power (Gathuci, 2020). Notwithstanding this, Kenya continues to be Africa's third-largest beer drinker, behind South Africa and Nigeria. Kenya holds 17% of Africa's alcohol market, whereas South Africa and Nigeria hold 18% and 36%, respectively, according to Diageo's market data (Murray, 2022).

In Kenya, there are several companies operating in the brewing industry. East African Breweries Limited (EABL), a Diageo subsidiary that produces popular brands like White Cap, Guinness, and Tusker, is the dominant force. EABL has a hybrid distribution strategy that makes use of both company-owned and outside warehouses. The biggest locally owned rival, Keroche Breweries, concentrates on expanding its domestic market and produces goods like Summit Lager. Furthermore, urban specialized markets are served by smaller craft breweries like Bateleur Brewery and 254 Brewing Co. Despite their diminutive size, they contribute to the industry's diversity and deal with particular logistics issues regarding to reach, scale, and storage.

These businesses rely on robust physical distribution networks that guarantee prompt delivery, appropriate storage, and economical transportation in order to effectively compete. Maintaining product quality, preventing spoiling, cutting down on delivery delays, and meeting customer demands all depend on effective logistics performance. Breweries may overcome these logistical obstacles, expand their market reach, and sustain economic growth with the aid of a carefully thought-out physical distribution strategy. Burity (2021).

1.2 Statement of the problem

The brewing sector plays a significant role in Kenya's economic growth through job creation, tax revenue, and support for related industries such as agriculture, logistics, and retail (Samuel, 2024). Key players like East African Breweries Limited (EABL) and Keroche Breweries have expanded operations to meet rising consumer demand across the region. Despite this growth, inefficient physical distribution systems continue to hinder the sector's ability to deliver products efficiently, reliably, and cost-effectively.

Globally, distribution challenges such as high fuel prices, driver shortages, and increasing customer expectations have reshaped logistics operations (Smith, 2021). In Kenya, these problems are worsened by poor road infrastructure, unreliable transport services, and limited warehousing capacity (Moyo & Kamau, 2022). The World Bank Logistics Performance Index (2023) ranked Kenya 2.81 out of 5, behind South Africa (3.5) and Rwanda (3.0), highlighting the country's persistent logistics inefficiencies. Additionally, the Kenya National Bureau of Statistics (KNBS, 2023) reported that transportation costs account for 55–60% of total logistics expenses in the manufacturing and beverage sector significantly reducing operational margins and competitiveness.

In the Kenyan brewing sector, poor transportation management often leads to delays in product delivery, especially in remote regions. Inadequate warehousing results in product spoilage, breakages, and stock imbalances, while ineffective inventory management leads to frequent stock outs or overstocking. Furthermore, manual and outdated order processing systems slow down delivery times and reduce customer satisfaction (Mwangi & Kariuki, 2022; Omondi & Wanyama, 2023). These inefficiencies not only increase operational costs but also weaken brand reputation and market responsiveness.

Although several studies have explored supply chain management and manufacturing performance in Kenya's beverage industry, limited research has specifically examined how physical distribution practices affect logistics performance in breweries. Most existing studies focus on broader supply chain strategies or foreign contexts, overlooking the unique challenges and local dynamics of Kenyan breweries. This gap in empirical evidence limits the ability of logistics managers to implement data-driven, context-specific distribution strategies.

Therefore, this study seeks to examine the effect of physical distribution practices transportation management, warehousing, inventory management, and order processing on logistics performance in Kenya's brewing industry. The findings aim to provide evidence-based recommendations to enhance operational efficiency, ensure timely delivery, and improve customer satisfaction in an increasingly competitive market.

1.3 Objectives of the study

This study was guided by both general and specific objectives as follows:

1.3.1 General Objective

To examine the effect of physical distribution practices on logistics performance in the Kenyan brewing industry.

1.3.2 Specific Objectives

i. To assess the effect of transportation management practices on logistics performance in the Kenyan brewing industry.

ii. To assess the role of warehousing management in optimizing with logistics performance in the Kenyan brewing.

iii. To assess the effectiveness of inventory management practices in enhancing logistics performance within the Kenyan brewing industry.

iv. To assess the effect of order processing practices on logistics performance in the Kenyan brewing industry.

1.4 Research Questions

i. What is the effect of transportation management practices on logistics performance in the Kenyan brewing industry?

ii. How do warehousing practices influence with logistics performance in the Kenyan brewing industry?

iii. How effective are inventory management practices enhancing logistics performance in the Kenyan brewing industry?

iv. What is the effect of order processing practices on logistics performance in the Kenyan brewing industry?

1.5 Significance of the Study

This study was significant as it provided insights into how physical distribution practices affect logistics performance in the Kenyan brewing industry. The findings benefited various stakeholders as follows:

1.5.1 Beer Manufacturers and Distributors

By evaluating key distribution practices such as transportation management, warehousing, inventory management, and order processing, this study will help brewing companies identify operational gaps, reduce distribution costs, improve delivery timelines, and enhance customer satisfaction.

1.5.2 Retailers and Wholesalers

The study offered valuable knowledge on how improved distribution practices enhance product availability and reduce stock outs, enabling retailers and wholesalers to optimize their replenishment cycles and improve service levels to customers.

1.5.3 Policy Makers and Regulators

The findings revealed logistical challenges such as infrastructure limitations and regulatory inefficiencies in the distribution of beer. This can inform policy decisions aimed at improving transport systems, warehousing infrastructure, and compliance frameworks in the logistics sector.

1.5.4 Academia and Future Researchers

This study contributed to existing literature by focusing on the operational aspects of physical distribution within the brewing industry. It will serve as a reference point for future researchers interested in logistics performance, distribution practices, and supply chain management in Kenya and similar contexts.

1.6 The scope of the study

The purpose of this study was to evaluate how logistics performance in the Kenyan brewing industry is impacted by physical distribution methods. It will specifically look at four fundamental procedures: order processing, inventory management, warehousing, and transportation management. Supply chain, distribution, fleet, and warehouse management segments were among the departments directly involved in the logistics activities that were the focus of the study, which was carried out inside a few chosen brewing companies in Kenya. Distribution coordinators, warehouse supervisors, supply chain officers, and logistics managers were among the respondents. Purposive sampling was used to choose participants according to their roles in physical distribution in order to guarantee depth and relevance. In order to ensure the findings' application and relevance to the industry's current logistics difficulties, it will be carried out within a certain timeline.

1.7 Justification of the study

Efficient physical distribution practices are vital for improving logistics performance and maintaining competitiveness in the brewing sector. The Kenyan brewing industry faces recurring challenges such as delivery delays, poor inventory control, and inadequate warehousing systems, all of which reduce operational efficiency and customer satisfaction. Despite these challenges, limited empirical studies have examined how specific physical distribution practices influence logistics performance within Kenya's brewing context.

This study is justified on several grounds. First, it addresses a clear empirical gap by focusing on the link between transportation management, warehousing, inventory management, and order processing practices and logistics performance an area that has received little attention in existing literature on Kenya's manufacturing sector. Second, it provides practical insights for brewery managers and logistics practitioners to improve distribution systems, minimize costs, and enhance customer service. Third, the findings will inform policymakers and regulators in designing logistics and infrastructure policies that promote efficiency and competitiveness in Kenya's beverage industry.

Additionally, this study contributes to academic knowledge by contextualizing established theories such as Resource-Based Theory, Agency Theory, and Bargaining Theory within the brewing sector. By integrating these theoretical frameworks with practical data, the research strengthens understanding of how internal resources and external relationships influence logistics outcomes. Therefore, the study is justified as both timely and relevant, offering actionable insights for academia, industry, and policy stakeholders seeking to improve logistics efficiency and overall business performance in Kenya's brewing industry.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the related literature. It explores scholarly perspectives, models, and empirical findings on how physical distribution practices including transportation management, warehousing, inventory management, and order processing affect logistics performance. The review was structured into theoretical and empirical sections. The theoretical literature explored key theories that underpin distribution and logistics performance, while the empirical review evaluates findings from previous studies across global, regional, and local contexts. This chapter also identified the research gap and develops the conceptual framework that guides the study.

2.2 Theoretical Review

This section discusses theories that provide a foundation for understanding the relationship between physical distribution practices and logistics performance in the Kenyan brewing industry. Theories such as Bargaining Theory, Resource-Based Theory (RBT) and Agency Theory are reviewed to explain how internal capabilities, outsourcing decisions, and cost-efficiency considerations shape logistics outcomes. These theoretical lenses can provide context for the ways in which breweries implement distribution practices to improve responsiveness, minimize operational inefficiencies, and increase customer value.

2.2.1 Bargaining theory

Bargaining Theory, first developed by John Nash (1950), provides a mathematical framework for understanding how parties with divergent interests reach mutually beneficial agreements. The Nash Bargaining Solution formalized economic negotiations by assuming rational actors operating under perfect information and seeking to optimize their respective utilities (Dimand, 2002). Subsequent extensions, such as Rubinstein's (1982) alternating-offers model, emphasized that bargaining is a dynamic and iterative process, where outcomes depend not only on preferences but also on each party's time sensitivity, negotiation power, and cost of delay. Schelling (1956) further broadened the application of bargaining concepts to strategic interactions in diplomacy, trade, and conflict resolution, introducing notions of credibility, commitment, and signaling in negotiation contexts.

However, later contributions by Kahneman (2003) and behavioral economists challenged the assumption of perfect rationality, noting that negotiation outcomes are influenced by bounded rationality, emotions, and imperfect information. Similarly, Sen and Folbre (1995) highlighted how social justice, power asymmetries, and inequality often shape bargaining outcomes in real-world scenarios. These perspectives have evolved into modern behavioral bargaining models, which account for fairness, trust, and cooperation in decision-making under uncertainty.

Recent studies continue to apply bargaining principles in logistics and supply chain management. Zhao and Huo (2021) demonstrate that collaborative bargaining between manufacturers and logistics service providers enhances supply chain responsiveness and reduces operational conflicts. Huo et al. (2022) found that negotiation-based contracting in third-party logistics (3PL) arrangements contributes to cost optimization and service reliability. Similarly, Lee and Kim (2023) argue that modern supply chains increasingly rely on cooperative bargaining frameworks to align performance targets and logistics service levels among partners, especially in dynamic markets affected by disruptions such as the COVID-19 pandemic.

In the context of the Kenyan brewing industry, Bargaining Theory explains how breweries negotiate service-level agreements (SLAs) and logistics contracts with suppliers, transporters, and distributors. For example, a brewery may seek to minimize transportation and warehousing costs while ensuring timely delivery, whereas logistics providers prioritize maximizing returns with minimal service delays. These negotiations determine critical distribution parameters such as delivery schedules, order processing lead times, and inventory replenishment cycles. The balance achieved through such bargaining processes directly affects logistics performance by influencing delivery reliability, cost efficiency, and customer satisfaction.

Therefore, Bargaining Theory provides a useful lens for understanding how logistics relationships are formed and sustained through negotiation and trade-offs among stakeholders. It underscores that effective physical distribution practices transportation management, warehousing, inventory control, and order processing are not merely operational outcomes but the results of strategic bargaining interactions that determine cost, service quality, and performance outcomes across the brewing supply chain.

2.2.2 Resource-based theory

Resource-Based Theory (RBT) posits that a firm's performance and competitive advantage arise from the unique bundle of resources and capabilities it possesses and effectively utilizes. The foundation of this theory traces back to Penrose (1959) in The Theory of the Growth of the Firm, where she argued that internal resources, particularly managerial skills, experience, and knowledge, are primary drivers of firm growth and diversification. Building on this foundation, Wernerfelt (1984) formalized the theory by emphasizing that competitive advantage stems from firms' internal resource positions rather than solely from favorable external market conditions. He conceptualized firms as heterogeneous entities possessing distinctive assets and capabilities that underpin long-term performance.

Barney (1991) refined RBT by introducing the VRIN framework, which evaluates firm resources based on whether they are Valuable, Rare, Inimitable, and Non-substitutable. According to Barney, only resources that meet all four criteria can yield sustainable competitive advantage. This perspective redirected strategic management toward understanding how firms can build and safeguard internal competencies to outperform rivals. Later scholars, such as Prahalad and Hamel (1990) and Teece et al. (1997), expanded the theory by incorporating the idea of dynamic capabilities, which refer to a firm's ability to reconfigure and adapt its resource base in response to environmental changes.

Despite its strengths, RBT has faced criticisms for its static nature and circular reasoning. Critics argue that it overlooks rapid technological and market shifts that can erode resource advantages and that it sometimes defines valuable resources tautologically based on their observed contribution to performance. Moreover, empirical application remains challenging due to the difficulty of measuring intangible resources such as organizational culture, knowledge, and innovation capacity (Peteraf & Barney, 2003; Helfat & Peteraf, 2015).

Recent studies have, however, extended RBT into dynamic business contexts, demonstrating its continued relevance. For instance, Chowdhury et al. (2021) found that firms leveraging unique logistics capabilities such as digital tracking, fleet optimization, and data analytics achieve superior delivery performance and customer satisfaction. Kumar and Rajesh (2022) observed that internal resource alignment, particularly in warehouse automation and transport coordination, significantly enhances supply chain efficiency. Similarly, Nguyen and Kim

(2023) emphasize that firms developing logistics competencies tailored to their operating environments gain resilience and adaptability in volatile markets.

In the context of the Kenyan brewing industry, RBT provides a valuable lens to understand how firms can build logistics performance advantages from their internal physical distribution capabilities. Breweries operate in environments characterized by infrastructural limitations, regulatory constraints, and fluctuating demand patterns. Firms that develop and integrate distinctive transportation systems, efficient warehousing layouts, responsive order processing technologies, and skilled distribution personnel can achieve a competitive edge in logistics performance. Such internal strengths satisfy the VRIN criteria by being difficult for competitors to imitate or substitute, particularly when embedded in firm-specific processes and culture.

However, sustaining these advantages requires continuous investment in employee training, technological upgrades, and performance monitoring. As Mutua and Wanjiku (2024) note, logistics capabilities in emerging markets like Kenya are only sustainable when firms strategically nurture and protect their resource base through innovation and adaptive management practices. Thus, RBT supports this study by explaining how physical distribution practices transportation management, warehousing, inventory management, and order processing serve as internal capabilities that can generate and sustain superior logistics performance within Kenya's brewing industry.

2.2.3 Agency theory

Agency Theory was introduced by Jensen and Meckling (1976) to address problems arising from the separation of ownership and control within organizations. The theory explains the relationship between a principal (such as the firm's owners) and an agent (such as managers or external service providers) where the agent is entrusted to act on behalf of the principal. However, since agents may act in their own self-interest, agency problems such as moral hazard, opportunism, and information asymmetry can emerge (Eisenhardt, 1989; Panda & Leepsa, 2017).

According to Agency Theory, agency costs result from monitoring, enforcement, and potential loss of value due to the agent's behavior. To mitigate these challenges, organizations adopt mechanisms such as performance-based contracts, auditing, and active oversight to align agent actions with principal goals (Kaczmarek, 2021; Shaikh et al., 2022). For instance, performance-based incentives encourage agents to make decisions that enhance shareholder value, while auditing mechanisms promote transparency and reduce information asymmetry between principals and agents.

Recent studies affirm that Agency Theory remains relevant in explaining contractual relationships in supply chains, especially where firms outsource critical logistics functions (Ali et al., 2020; Rahman & Subramanian, 2021). In such cases, firms must design contracts that minimize opportunistic behavior and align incentives to ensure reliable service delivery and operational efficiency.

Nevertheless, the theory has been criticized for its overly economic and rational view of human behavior, assuming that agents are entirely self-interested (Peprah, 2020). It tends to ignore social, ethical, and intrinsic motivational factors that influence agent behavior and may discourage innovation through excessive control (Donaldson, 2021). Moreover, its focus on shareholders can overlook other key stakeholders in the supply chain, limiting its broader application in collaborative environments.

In the context of the Kenyan brewing industry, Agency Theory provides valuable insight into the relationship between brewing firms (principals) and logistics service providers (agents). When breweries outsource physical distribution, they must establish clear contracts and performance metrics to minimize agency costs and ensure that agents act in the firm's best interest. For example, performance-based agreements can enhance timely deliveries, reduce stock-outs, and improve customer satisfaction. Therefore, the theory supports the need for effective control mechanisms that align agent behavior with organizational goals, ultimately enhancing logistics performance in the sector (Mutuku & Kinyua, 2023).

2.3 Empirical Review

2.3.1 Transportation management Practices

Transportation management is a key aspect of physical distribution practices and has a great impact on logistics performance in the Kenyan brewing industry. It refers to the planning, execution, and optimized logistics of transporting raw materials such as barley, hops, and water to the brewing facilities, and finished beer products from the brewery to a distributor, retailer, or consumer. While good transportation practices can assist in delivering products on time, reliably, and cost-effectively, they will also lead to improvement in one of the logistics performance indicators which is customer satisfaction.

In the case of the brewing industry, it is necessary for a manufacturing facility to coordinate transportation practices with warehousing and inventory control practices to ensure a smooth supply chain. Transportation practices encompass fleet management, schedule routing, delivery scheduling, and vehicle maintenance which can all assist in reducing lead times, improving service levels, and increasing efficiency.

Empirical studies have reinforced the critical role of transportation practices in enhancing logistics efficiency and overall supply chain performance. For instance, Gideon (2024) examined Kenyan textile manufacturing firms and found that adopting practices such as optimized routing, improved fleet utilization, and integration of transport planning systems enabled managers to make more informed decisions. These practices not only streamlined the flow of goods but also reduced fuel consumption, minimized vehicle downtime, and lowered operational costs. Such findings are highly relevant to the brewing context, where transport efficiency directly affects distribution speed, product freshness, and customer satisfaction.

Similarly, Wibet (2022) investigated the role of transportation in reverse logistics within Kenya's food sector, highlighting the importance of structured return systems for packaging and other reusable materials. His study underscored that without efficient transport arrangements, return flows such as collection of containers, crates, and packaging materials become costly and unreliable. This insight is particularly applicable to brewery logistics, where returnable bottles and crates form a central part of operations. Establishing well-coordinated reverse transport systems ensures sustainability by reducing waste, cutting costs, and maintaining a steady supply of reusable assets.

Ruxho (2022) further emphasized that transportation practices directly influence supply chain performance through their impact on delivery reliability, cost-efficiency, and responsiveness to market demands. His findings suggest that transportation is not simply a supportive function but a strategic enabler of competitive advantage. Firms that invest in reliable transport networks, timely deliveries, and flexible logistics solutions are better positioned to meet customer expectations and adapt to market fluctuations. Collectively, these studies demonstrate that transportation is a cornerstone of logistics management, linking operational efficiency to customer service quality and long-term organizational competitiveness.

Chadalawada (2024) posits that transport performance is most effectively evaluated through key indicators such as delivery time and cost, which remain central benchmarks for assessing efficiency in logistics operations. The study emphasizes that timely deliveries not only enhance customer satisfaction but also reduce the risk of disruptions across the supply chain, while cost efficiency ensures sustainable profitability for organizations. By focusing on these measurable indicators, Chadalawada underscores the need for logistics managers to adopt performance monitoring systems that balance speed with cost-effectiveness. This perspective aligns with broader supply chain literature, which consistently identifies delivery reliability and cost optimization as critical drivers of operational performance and competitive advantage in transport-intensive industries.

Gideon (2024) further examined the performance of traditional algorithms in comparison to a newly developed algorithm and demonstrated that the conventional approach requires considerably more time to arrive at the correct solution. The study highlights the limitations of traditional computational methods, particularly their inefficiency in complex or large-scale problem-solving contexts. By contrast, the improved algorithm introduced by Gideon not only reduced the time required to identify the correct pathway but also enhanced overall accuracy and operational efficiency. This finding contributes to the growing body of literature advocating for innovative algorithmic approaches that optimize performance by reducing computational delays while ensuring reliability. Moreover, the study provides an important benchmark for evaluating the trade-offs between legacy systems and newly developed solutions, underscoring the critical role of algorithmic innovation in supporting timely decision-making across various applications.

Omoush (2022) investigated the influence of logistics management practices on operational performance and established that effective management across key dimensions — including inventory management, warehousing, order processing, transportation, and packaging — has a considerable positive impact on the efficiency of road transport companies. The study emphasizes that when these logistics practices are well-coordinated, they enhance resource utilization, reduce operational costs, and improve service delivery reliability. By breaking down logistics into specific functional areas, Omoush provides evidence that improvements in each dimension contribute cumulatively to superior organizational performance, particularly in industries where timely delivery and operational flexibility are critical. These findings not only reinforce the strategic role of logistics management in achieving competitiveness but also align with broader research highlighting the direct relationship between well-structured supply chain practices and enhanced organizational outcomes.

Despite these findings, research specifically targeting transportation management practices in Kenya's brewing sector remains limited. Context-specific issues such as rural route challenges, traffic congestion, regulatory constraints, and road infrastructure present unique barriers that require tailored empirical investigation. Understanding these localized challenges will help breweries design more robust transportation practices that support improved logistics performance across the board

2.3.2 Warehousing Practices

In considering physical distribution practices that affect logistics performance in the brewing industry in Kenya, warehouse practices emerge as an important dimension. In the context of logistics, warehouse practices can be summarized as managing and facilitating processes associated with storage, handling, and distribution, in a way that meets the high-volume operational requirements of the industry.

The context of brewing in Kenya has multiple examples of how good warehouse practices can improve logistics efficiency and operational performance. East African Breweries Limited (EABL) is a good example of a firm that uses good warehouse practices to enhance logistics performance. Tulli (2023) conducted research that illustrated how enhanced space utilization and shorter lead times can be realized through warehouse location, especially when they are near important transport infrastructure including railway stations and the Mombasa–Nairobi corridor. Locating warehouses near distribution targets reduces the time in transit, lowers fuel costs, and enhances supply chain reliability. When this is managed well, the supply to both urban and rural markets happens on time and strengthen distribution networks, enhance customer participation, and when done well, facilitates availability of products. In addition to location, good warehouse practices also include the integration of technology and process improvement. For example, EABL uses Warehouse Management Systems (WMS) to better track available stock in real-time, automate stock replenishment, and minimize human error from manual handling as well as efficiencies in design. For example, it includes modifying the warehouse floorplan to reducing picking times.

Moreover, the practices associated with warehouses are essential for the maintenance of returnable packaging systems prevalent in breweries. A well-run warehouse offers the ability to store and sort bottles and crates after being returned from distributors and retailers, cleaning, repurposing, and reintroducing them into the cycle of production. This aids savings, while also distributing and reusing resources, furthering sustainability goals, and reducing waste. As well, the example from EABL illustrated that warehouses are not just places for storage, but instead are pivotal in planning as assets that leverage the pursuit of production, distribution, and sustainability. When integrated with transport infrastructure, and coordinated with contemporaneous management systems, warehouse strategies are a backbone of logistics effectiveness in brewing.

Al Nashmi (2024) outlined how the benefits of advanced warehouse strategies including strategies like slotting optimization and zoning maximizing the efficiency of order fulfillment. In the study, slotting optimization to organize items within storage space with regards to frequency of demand and handling requirements achieved improvements in travel time up to 30%. Zoning strategies which divided warehouse space into zones dedicated for product categories, types of orders improved order picking speed by 40%. The research demonstrates the significance of design and operational strategies of warehousing to improve productivity in order efficiency and labor reduction.

Research conducted by Al Nashmi in (2024) indicated that advanced practices in warehouse management, particularly slotting optimization and zoning strategies, can increase order fulfillment efficiency. The study reported that by optimizing the slotting of items by purposefully associating the items in the storage area to how often items are requested and operational capabilities, researchers observed a decrease in travel time of up to 30 percent. Zoning strategies, and specifically assigning a space in the warehouse for a particular product category, order type or some logical means of allotting space resulted in increased pick speeds of 40 percent, according to the research. The study results illustrate the significant role warehouse design and practices play to overall productivity and efficiency of ordering management successes and labor usage, while also contributing positively to the supply chain performance overall. With regard to the research providing quantitative results on efficiency improvements, it is suggested that research study is especially applicable and serves as a useful empirical contribution to the logistics management literature's use of science to inform decisions to optimize the warehouse and reduce cost, while aligning with consumer satisfaction in logistics measures.

Genevieve and Akumuntu (2024) investigated the influence of warehousing management on supply chain performance in a study of Inyange Industries Ltd and concluded that effective warehousing management enhances supply chain performance. Their study noted that the best utilization of space, careful inventory management and improved order accuracy in conjunction with the application of technology within warehouses contributed effectively to efficiency levels, operational costs and timely delivery of products. To emphasize the importance of warehousing, Genevieve and Akumuntu made the point that it is strategic management of warehouses and their operations and not merely warehouses and their operations that contribute to bottlenecks, delays and costs and therefore decrease customer satisfaction. They noted that a strategic view of warehousing is important for business firms for the sake of adopting modern warehousing practices that stimulate competitiveness and responsiveness versus. perishable markets.

There are also warehouse practices that require adopting technology and suitable warehouse inventory policies. Alsoussi, (2025) found that adopting automated warehouse management systems (WMS) greatly improved the speed of order fulfillment and in conjunction with practicing just-in-time (JIT) warehouse inventory practices provided the best opportunity for productivity-based cost-performance and reliability levels of service to the customer. This would provide improved inventory accuracy and also reduced holding cost and improved responsiveness to market demand.

Nonetheless, the effectiveness of warehouse practices is subject to both external and internal considerations. Internally, employee training, system compatibility, and the organization's ability to use new technologies determine warehouse operation efficiency. Externally, road safety and conditions, infrastructure availability, and regulations impact the accessibility and functionality of warehouses. Warehouse practices are key to aligning physical distribution within logistics performance in the brewing industry in Kenya. Breweries can enhance their distribution responsiveness, lower costs, and improve service delivery in the supply chain by focusing on location strategy, processing efficiency, and technological assistance.

2.3.3 Inventory Management Practices

Inventory management practices are necessary to ensure firms such as East African Breweries Limited (EABL) sustain optimal stock levels that meet fluctuating customer demand while minimizing their holding costs. The ultimate aim is to ensure that raw materials (i.e., malt and hops) and finishes goods are available in such a way that stock outs or excess inventory do not occur. Studies support that stock outs can appear to increase during busy periods such as December leading to poor service and/or customer satisfaction (Gallien, 2021).

Inventory management practices are critically important to achieving reliable delivery especially in Kenya's brewing industry. These practices can include, for instance, strategies like Just-In-Time (JIT) delivery and safety stock policy. Whereas JIT can operate with lower inventory holding costs and a more efficient service by matching supply to demand, it is prone to external disruptions such as poor infrastructure, unreliability suppliers, or delays because of transport. In such conditions boosting supply chain responsiveness by of safety stocks can be necessary (Bilal, 2024).

Several works emphasize the crucial role of inventory management in ensuring continuity of operations. For instance, Kiplagat (2023) determined that breweries adopting hybrid approaches combining JIT with strategic buffer inventories achieved improved supply chain disruption resilience without incurring significant additional inventory costs. Muthoni and Koech (2022) also observed that carrying safety stock levels is particularly critical in industries like brewing, where seasonal demand fluctuations and perishability risks require flexible yet reliable supply chain efforts.

Besides cost and risk management, inventory practices are also at the center of supporting customer satisfaction and service levels. Otieno (2021) noted that proper stock control and demand forecasting in Kenya's beverage sector improved order fulfillment rates and reduced cases of stock-outs, thus entrenching brand loyalty. Along with that, the integration of technology, i.e., Enterprise Resource Planning (ERP) and Inventory Management Systems (IMS), has been discovered to combine real-time tracking and enhance forecast accuracy. This reduces wastage and enhances production planning (Chandran, 2023). Other scholars support this view by linking effective inventory management with stronger supply chain performance. For example, Mwangi and

Cheruiyot (2022) concluded that breweries that applied predictive analytics in inventory planning were better able to respond to unforeseen demand surges, with the immediate result of improving customer satisfaction. Similarly, Gideon and Achieng (2023) concluded that end-to-end supply chain inventory visibility improved coordination between suppliers, distributors, and retailers, minimizing delays while ensuring a stable product stream.

On a global scale, Kumar and Singh (2021) showed that companies in the beverage industry utilizing integrated inventory systems have much shorter lead time and service level fluctuations. Their research indicated that inventory can be a buffer for uncertainty, but also a competitive weapon as it provides competitive differentiation. In an African context, Njeri (2022) described the breweries that employed safety stock buffers alongside JIT methods could achieve the greatest cost savings and product availability in markets even with some infrastructural instability.

These evidence based studies exhibit strong inventory control is not just about controlling costs, it's a force of competition. For the brewing organization, the balance between lean methods such as JIT with strong safety stock practices, sophisticated forecasting, and computerized inventory management systems creates product availability, market responsiveness, and logistical efficiencies, while developing customer loyalty and continuous market growth.

In another similar study, Bakri (2025) found that computerized inventory management systems can lead to incredible process improvements. The study demonstrated a 30 percent improvement in stock opname accuracy, a 60 percent reduction in inventory discrepancies, and a 50 percent reduction in reconciliation time reducing outstanding stock orders and transactions errors. These results reflect the application of technology-based solutions that improved the reliability of stock records, lower errors and improved the audit process! Al Nashmi (2024) and

Bakri (2025) provide empirical evidence that improving warehousing and inventory practices will improve efficiency and enhance overall supply chain performance.

In a similar vein, Clark and Mertens (2024) also investigated the role of survey expectations and forecast uncertainty as they impact the reliability of forecasting models, in their chapter for the Handbook of Research Methods and Applications in Macroeconomic Forecasting. They emphasized that the reliability of forecasting processes is extremely sensitive to the way expectations are measured and the way uncertainty is measured in the survey context. The incorporation of expectations from surveys into forecasts contributes to more reliable forecasting as a means of anticipating variability better, and subsequently informing operational decisions, with less historical stock versus order disalignment risk. This study is very relevant to the logistics and inventory management space, where uncertain demand and supply variability creates complications in effective decision-making regarding processing orders. Overall, findings from Bakri's (2025) work and the chapter by Clark and Mertens reinforce the value of precision, whether measuring stock movements or expectations of future time period expectations, in facilitating more effective and resilient supply chains.

Jean (2024) examined inventory management approaches emphasizing the balance between cost effectiveness and customer satisfaction, illustrating the conflicts faced by organizations in aligning their operations with market demands. The paper noted that while lower inventory levels were associated with improved efficiency and lower holding expenses, they also raise the risk of stock outs, which in turn has a detrimental effect on customer satisfaction. Higher inventory levels are associated with ensuring product availability and responsiveness but also with increased costs of storage as well as less profitability. Jean states that effective inventory management is dependent on some operational procedures including: just in time systems, estimating demand, and being able to track inventory with technology. All of these help find an optimal position for inventory management. The objective of the paper is to showcase not just inventory management as a cost technique, but a valuable avenue for customer service that adds dual value through improving efficiencies and competitiveness in fast-moving markets.

In terms of inventory control, most methods are also significantly reliant on predictive demand forecasting, including real time tracking of inventory to manage stock outs, back logs and holding costs. In the context of the brewing sector in Kenya, having effective inventory management practices directly supports logistics performance through improved cost effectiveness, on-time delivery and customer satisfaction (Mwakima, & Osoro, 2024). These approaches assist organizations in managing the challenges of logistics operations, particularly in contexts where unsaturation of supply and demand will require careful planning and rapid responsiveness. Ultimately, inventory management practices are a crucial part of physical distribution because they will impact an organization's ability to satisfy demand, while also controlling costs and maintaining a stable level of service.

In a study by Tamiru (2022) on the impacts of inventory management practices on organizational performance, a case was conducted within the Ethiopian Pharmaceuticals Supply Agency, Bahir Dar branch. Within the study, it was found that good inventory management practices such as accurate demand forecasting, monitoring stock levels, developing timely replenishment practices, and using modern inventory management techniques, enhanced the operational efficiency of the service delivery organization. It was noted that poor inventory management often leads to stock outs, overstocking, and wastage which hinder organizational performance as well as customer satisfaction. Whereas well-structured practices will lead to more efficient resource optimization, lower operational costs, and better organizational responsiveness to supply essential pharmaceuticals. The study notes the centrality of inventory management to ensure not only cost-effectiveness, but more importantly output reliability of vital supply chains, particularly in sectors such as healthcare, where product availability is especially relevant to public welfare. Tamiru's research thus dilutes, the wider evidence base supporting sound inventory control.

2.3.4 Order Processing Practices

The effective processing of orders is a crucial aspect of physical distribution that affects logistics performance in the Kenyan brewing sector. These processing activities refer to any activities associated with receiving, processing, verifying, and fulfilling customer order requests. In the brewing industry, which is often characterized by high volume and time-sensitive deliveries, efficient order processing allows for time-sensitive services to be fulfilled in a timely, accurate, and customer-focused manner.

In the brewing sector, when a brewery experiences any delays when processing customer orders, it causes service interruptions, stock-outs, and/or problems with customer satisfaction, especially for distributors and retailers that rely on having beer delivered to them in a timely manner. Mwangi (2023) found that efficient order processing procedures, which include automation, the implementation of ERP systems, and a structured order format, would streamline the time required to process orders, while minimizing errors and improving overall delivery precision. Efficient and effective order processing procedures, such as those mentioned, are especially important during peak order seasons when the volume of orders increases.

Numerous studies have added corroboration to the need for efficient order processing. Kimani and Wekesa (2022) demonstrated that leveraging automation to support data entry and validation of orders in a Kenyan manufacturing firm decreased manual bottlenecks and improved coordination with other departments (sales and logistics). Similarly, Waweru (2021) saw that breweries began utilizing electronic data interchange (EDI) systems that enhanced collaboration with distributors by processing bulk orders more quickly and with fewer discrepancies.

A growing number of international studies examined the possible benefits that beverage companies could have by utilizing digital order-management systems and/or integrated customer platforms. Oliveiran and Silva (2021) found that, among Brazilian beverage companies surveyed, the companies that used real time order tracking and integrated Customer Relationship Management (CRM) dairy systems were able to contribute measurable improvements in both delivery reliability and communication with their customers, resulting in fewer customer complaints about delayed shipments and a higher quality and reliability of service with retail partners. The use of digital solutions improved on the inherent delays in any type of information requesting to measure progress, as sales, warehouse and logistics teams could all reference one source of truth regardless of time of day or role. Proactive exception management is a terrific feature as well, as it allows schedulers or account managers to be notified sooner of possible delayed orders and develop forward thinking action. Responsiveness, in particular with respect to product development, is vital in beverage markets, where stock outs during promotional periods or significant sporting events can lead to long-term negative effects on retailer trust and brand momentum.

In the Ghanaian context, Mensah and Boateng (2022) documented how digital platforms that linked retailers directly to breweries (allowing electronic ordering, automated approvals, and integrated payment flows) reduced transaction costs and sped up order cycles. Their study found that simplified digital order channels also strengthened relational trust between small retailers and brewery distributors: transparency around order acknowledgment, expected delivery windows, and automated invoicing decreased disputes and facilitated quicker reconciliation. For breweries in fractured retail markets, where many small retailers will place many smaller orders frequently, these systems meaningfully decrease the administrative load per order and help better fulfill orders. Add to those theoretical studies, large industry cases illustrate real-world scale impacts when beverage corporations comprehensively invest in their supply chain to digitize it from end-to-end.

The Coca-Cola ERP case study (a detailed study in integrated a CRM-ERP case study) shows how integrated enterprise systems can centralize order processing, inventory visibility, and route planning providing better forecasting, lower stock issues, and faster dispute resolution between the sales and logistics functions. The Coca-Cola example shows that integrated systems accomplish indeed more than fast processing; the integrated system generates analytical tools that provide insights into recurring points of failure (i.e., late shipments associated with specific routes or SKUs) allowing companies to redesign their work processes and redeploy their resources more efficiently. This is highly relevant for breweries that have several SKUs (bottled beer, cans, returnable bottles) which require coordination across packaging, cold-chain, and retail deliveries.

Another instructive industry innovation comes from AB InBev's Zé Delivery project, a rapid-delivery platform that re-engineered last-mile beverage distribution by applying data-informed demand forecasting and flexible order fulfilment. Zé Delivery is often described as an ecommerce and consumer facing service, but the operational learnings of Zé Delivery are directly applicable to B2B brewery distribution. Dynamic routing algorithms, tightly integrated order intake and delivery assignment, and real-time ETAs for customers provide substantially higher on-time performance with improved communication to customers. For breweries, implementing even relatively simple capabilities will decrease lead times and improve predictability for retail and on-trade (bars, restaurants) customers that require a timely restock of products.

Numerous smaller studies, but methodologically rigorous, on mobile sales-force automation adds another layer to the literature. ACI &T case study of a mobile app deployment in the field by Kirin (Brazil) showed that implementing mobile order-taking apps synced immediately with backend systems resulted in order capture speed increasing by approximately 50% and data accuracy improved drastically (fewer incorrect SKUs, quantities, or pricing errors). Faster and more accurate order entry not only speeds up warehouse picking and shipping, but also provides richer point-of-sale information for demand forecasting models. For breweries, especially those using route sales, or direct store delivery (DSD) models, mobile order capture eliminates friction at the retail interface and speeds transition from sales to logistics.

Three additional empirical contributions provide further support for using digital order systems and process standardization in the beverage industry. First, an applied study of food and beverage ERP adoption reported empirical lead-time reductions and order accuracy improvements after firms coupled ERP with their distribution networks. The authors attributed lead-time and order accuracy improvements to the benefits of using centralized inventory visibility, automated inventory replenishment triggers, and increased coordination between finance and logistics functions. These insights suggest that the potential investment breweries would incur upon adopting ERP platforms can often be recouped based on reduced emergency shipments, fewer stock outs, and lower working capital being tied up in working inventories.

Cross-country studies on e-commerce and mobile ordering amongst SMEs indicated a positive relationship between digital ordered - Highly matched as written `digital ordering - e-means using an application or web-based platforms ‘and order frequency and predictability, more so when the platforms contained built-in payment or credit for retailers. Where retailers are small retailers with limited access reliably credit or payment solutions, embedding a digital payments system in the ordering platform removes some of the payment frictions and reduces proportions of cancelled or partial orders and directly make more effective the brewery distribution system relative to more traditional orders. These contributions seem relevant when breweries provide products for unorganized retailing or informal retail channels that dominate beverage consumption in many African markets.

In research on the integration of ERP/CRM in beverage firms in the US and Brazil, all systems that integrate customer and order history, and delivery metrics, provide account managers with the authority to execute targeted interventions (e.g, prioritized delivery windows for critical accounts, promotional bundling to help balance SKUs on route) that improve both sales and service levels. The strategic implication for breweries is that digital order systems are not merely back-office efficiency tools but platforms for commercial differentiation: better service fosters retailer loyalty, supports premium positioning, and reduces the ad hoc firefighting that erodes margin.

The scholarly and industry evidence paints a clear picture: digital order management, real-time tracking, and ERP/CRM integration materially improve delivery reliability, lower transaction costs, and strengthen retailer relationships in the beverage sector. For breweries, whose products are often perishable, seasonally demanded, and distributed through complex multi-tier channels, adopting these capabilities reduces order processing errors, improves forecasting fidelity, and enhances transparency across the supply chain. The literature also coalesces around a usable formula: link mobile order capture at the retail interface, centralized ERP/IMS for inventory and dispatch planning, and the customer-facing tools for tracking and CRM to preemptively convey status and handle exceptions. By doing this, breweries can both mitigate margin pressures and reinforce the service levels that retailers and on-trade customers expect results that are increasingly important in competitive beverage markets around the globe.

In sum, these findings suggest that effective order processing systems perform not only as administrative systems, but as strategic levers to maximize customer satisfaction and ultimately benefit overall supply chain performance. For breweries, automation, ERP, and digital order screens matter because they ensure agility during high-demand periods by balancing speed of order, product availability, and minimizing the error risk resulting from complex product logistics when ensuring brand reputation for reliable delivery service is a focus.

Ravula (2022) illustrated that order processing and delivery timelines do indeed affect customer satisfaction; specifically, longer lead times have been consistently associated with lower customer ratings. The study reinforces the importance of timing for customer service liberalization, whereby longer processing or delivery timelines will increase customer dissatisfaction, generate negative comments about the organization and negatively affect customer loyalty. Finally, by linking greater operational effectiveness to the way customers form opinions this study suggests more broadly that organizations must value speed and reliability in their order fulfillment process. The research presented by Ravula adds support to the common view found in literature on logistics and supply chain management, which is that responsiveness is not only an operational measure, but is also a strategic enabler of customer trust, retention, and overall organizational performance.

Saha, Aqlan, Lam and Boldrin (2016) put forward an End-to-End Customer Order Management System (E2E-COMS) that seeks to manage the effective use of individual and shared resources to work more efficiently in real-time order management, and with reduced risk of managing multiple operational missions. It achieves this by merging order capture, processing, resource allocation and exception handling into a single applications platform so that customer orders can be continuously visible, and resources coordinated on-the-fly. The authors emphasize managing shared resources, as managing bottlenecks and prioritization conflicts are some of the most relevant risks and conditions for service around multi-mission contexts. While the proposals appear to be conceptually sound, the proposal does not seem to provide a comprehensive level of empirical validation, which may raise questions about how easy this solution would be to scale, develop and integrate with legacy systems or how applicable it would eventually be in dynamic and chaotic real-life scenarios. The value of the framework above, from the authors' perspective, lies in both theoretical and practical value for scholars and researchers by offering order management as a structured process, architectural patterns for improving responsiveness and a systematic way to think about risk mitigation as an objective in customer order systems.

Sebata (2024) explored how logistics activity relates to organizational financial performance, revealing that effective logistics practices lead to cost savings, revenue generation, and overall profitability. The research emphasized that effective logistics would include effective logistics in transportation, order fulfillment, warehousing, and inventory may result in lower operating costs and greater dependability of overall service, which may then drive customer retention and competitive advantage. In contrast, poor logistics efficiency leads to increased costs and delivery time, resulting in poorer customer service, which negatively impacts financial performance. By linking efficiency of operations to financial performance indicators, Sebata suggested logistics should be viewed as a strategic driver of sustainable financial performance, rather than as a simple support activity. This reinforces the argument that investing in logistics improvements will benefit the organization both operationally and economically.

Research by Chikanya and Mutsau (2022) in the Zimbabwean beverage industry, shows evidence that order tracking systems using a digitized platform and integrated customer relationship management systems can lead to increased visibility of demand, improved coordination between departments requiring logistics, and improved communication with customers. As brewers aim to modernize their operations and better react to changing customer expectations, practices such as these will be adopted increasingly within the Kenyan brewing industry.

Order processing practices have implications for how breweries handle returns, cancellations, and special orders, and all these affect logistics performances. Order processing systems that are fast and efficient can provide near real-time updates, automate inventory reconciliation, and improve communication with drivers that when working together can, in theory, shorten lead times and increase reliability. Having a robust system cannot eliminate the challenges every organization will face. For example, entering orders manually may delay or prevent delivery, or a scheduled system wipe or downtime due to extended rations of reversal and miscommunication of orders between sales and distribution can eliminate efficiencies realized from the use of efficient systems.

Topalović (2015) found that commitment, courtesy, and responsibility toward customers from management were significant factors in customer satisfaction. Topalović (2015) concludes that commitment to operational efficiency has value, but it is more about the attitude of leadership in an organization that contributes to the experience for the customer. Organizational commitment is needed to allocate resources and set policies that put customers first, courtesy, and responsibility reflect an organizational culture of respect and accountability. Commitment contributes to not only increased satisfaction but longer-term customer loyalty and trust. By emphasizing the human leadership aspect of a system of service, Topalović complements operational studies by reminding organizations that sustainable customer service satisfaction requires systems that enable efficiencies of manpower; a service culture comes from the attitude of leadership and is also to be fostered in organizations.

Thus, embracing best practices such as automation, employee training and support, regular auditing, or customer support will improve order cycle efficiency and logistics performance. Implementing best practices associated with order processing will compel timely and accurate order fulfillment and improve the overall physical distribution system in Kenya's brewing industry. Best practices related to order processing will be an integral element in improving the logistical performance led by minimizing delays in operation and enhancing service level in the highly competitive and dynamic supply chain.

2.4 Research Gap

Although the significance of physical distribution practices in logistics management is acknowledged, little research specifically addresses the Kenyan brewing industry. Most of the studies around Kenya's manufacturing … have addressed wider issues of supply chain management, such as reverse logistics, competitive strategies, etc. without considering the distribution issues, as related to brewers.

Physical distribution practices, such as transportation, warehousing, inventory control, and order processing practices, are essential in establishing logistics performance on the basis of targeting key thresholds, such as delivery speed, operational capabilities / costs, and customer satisfaction. Together, they represent the structural back bone of the supply chain, facilitating the distribution of products from a production point, to a distribution point, and finally to a consumable point. In certain industries (like brewing), freshness, packaging, and supply are vital aspects of a supply chain, thus successful physical distribution effectiveness directly increases market competitiveness and brand loyalty across the respective brewing industry.

Transportation is one of the most obvious and expensive aspects of physical distribution. Efficient practices such as routing optimization, vehicle scheduling, and fleet utilization will not only lower operational costs, but also enable reliable and timely deliveries. Gideon (2024) found that manufacturing firms in Kenya utilizing a routing optimization system reduced their fuel use, delays, and overall decision making in the management of transportation. These results are particularly relevant for the brewing industry where delivery reliability is essential during peak consumption periods, such as holiday seasons and major sporting events. Furthermore, the efficiency of transportation affects reverse logistics within breweries, especially regarding the reclaiming of returnable glass bottles and crates, which is important for sustainability and cost (Wubet, 2022).

Warehousing is another main aspect of physical distribution that can significantly contribute to logistics performance. A coordinated warehouse location and design can facilitate a more expedited and economical response to customers. Research by Tulli (2023) identified that localizing warehouses near supply corridors such as the Mombasa–Nairobi Standard Gauge Railway and major roadways can potentially lower lead-times and provide better levels of service for urban and rural markets. In Kenya's brewing industry, companies like East African Breweries Limited (EABL) utilize strategically position depots and distribution centers to ensure the company is reachable across all 47 counties. In addition to strategic placement, warehouse management systems (WMS) provide better warehouse space utilization, improve visibility over inventory, and reduce order-picking errors. Warehouses well-organized can also accommodate reverse logistics processes by allowing for sorting and re-integration of returnable packaging back into the production process, providing cost savings and support sustainability initiatives.

Inventory management processes also enhance the efficiency of the physical distribution process. Efficient practices such as Just-In-Time (JIT), managing safety stock, and demand forecasting assist firms in finding optimal levels between reducing costs and availability of product. According to Bilal (2024), while JIT controls holding costs, it also places firms at risk of disruption in non-ideal environments with problems in infrastructure and suppliers as evidenced in a typical Kenyan context. Therefore, breweries typically utilize hybrid practices such as holding safety stock to counter issues with unforeseen increases in demand or disruptions in supply chain

(Kiplagat, 2023). Additionally, efficient inventory management assists in maintaining a constant flow of products and deliver high levels of customer satisfaction due to reduced stock-outs. Digital technologies such as Enterprise Resource Planning (ERP) and Inventory Management Systems (IMS) enhance forecasting accuracy and responsiveness by aligning stock levels with fluctuating demand in the marketplace (Chandran, 2023). Order processing is at the customer-firm interface and directly impacts service quality expectations; consequently, order fulfillment that violates these expectations in terms of speed, accuracy, or satisfaction will have negative effects. Mwangi (2023) found that, through ERP and digital standardization of order processing, automated breweries in Kenya could reduce errors while improving speed and delivery accuracy along their supply chains. This is especially important during peak periods with high order volume; given the operational aim to process large volumes of orders accurately and quickly. Likewise, studies in different geographical contexts reinforce this finding; Oliveira and Silva (2021) found that Brazilian beverage companies were able to improve delivery reliability and customer communications with digital order tracking and customer relationship management systems reducing complaints about late deliveries. In Ghana, Mensah and Boateng (2022) described how an online platform increased efficiency, trust, and collaboratively reduced transaction costs by linking retailers directly with breweries to streamline the ordering approval process between supply chain partners.

Despite these findings, there is still a limited number of studies that have connected particular physical distribution practices--such as centralized warehousing, route optimization, or digitalized order-tracking--to logistics performance outcomes in the context of brewing companies in Kenya (Kithu, 2022). Where research has been published in this area, it focuses on manufacturing or food and beverage contexts, highlighting a gap in the literature. The brewing sector relies on returnable packaging, inputs (e.g. malt and yeast) that can easily perish, and fluctuating consumer demand, which would suggest that empirical research designs would assist practitioners in the brewing industry. For example, centralized warehousing could reduce overhead costs as well as improve inventory management, but it could also increase lead time to remote markets unless the total logistics chain is planned to ensure efficient transport plans are used. Optimization (routing) tools could lower fuel costs and improve dependability, but their effectiveness will be dependent on current state of the overall infrastructure in Kenya, such as road conditions or urban congestion.

Further, contextual challenges faced when researching the physical distribution of beer, such as underdeveloped infrastructure, ambiguous regulatory systems, uneven distribution between urban and rural areas, and perishability of beer have not been explored in the literature that pertains to breweries. Each contextual challenging presents a layer of logistical complexity, and therefore requires empirical studies that develop the literature in a sector-focused manner.

Outside Kenya, studies in developed markets like the UK, US and South America have explored the adoption of advanced tools such as AI in distribution planning, cold chain logistics, and real-time delivery monitoring. However, their relevance in Kenya where firms operate under resource limitations is not well understood (Mbugua et al., 2024).

Addressing this gap is critical. Enhanced physical distribution practices could significantly improve logistics performance, supporting not only firm-level efficiency but also broader industry competitiveness. There is a pressing need for empirical research that evaluates which distribution approaches are most effective within the Kenyan brewing context.

Table 2.1: Summary of Empirical Studies on Physical Distribution Practices and Logistics Performance

Author	Focus of the Study	Methodology	Findings	Research Gap
Kiarie, E N, & Nderui, D N U (2024).	Impact of outsourced logistics services on performance of alcoholic beverage firms	Adopted a descriptive research design	Logistics outsourcing led to improved operational efficiency and overall firm performance	Did not explore specific physical distribution practices like warehousing, order processing, and inventory control, and their influence on logistics performance
Langat, E K, & Karanja, P. W (2021).	Supply chain distributions and customer service performance in the beverage sector	Adopted a Descriptive statistics method	Prompt and responsive distribution improved customer service performance	Focused on customer service rather than evaluating physical distribution practices like storage, transport routing, or inventory

				management on logistics outcomes
Kithu, J. M (2022).	Influence of distribution logistics on performance of soft drink manufacturers	Adopted descriptive survey design	Distribution logistics had a positive effect on performance of soft drink firms	Industry-specific to soft drinks and did not address warehousing or inventory practices; limited insight on order fulfillment in alcoholic beverage firms
Ogesi, S (2020).	Multi-channel retailing and operational performance in select alcohol manufacturers	Descriptive research design	Multi-channel retailing enhanced distribution flexibility and boosted performance	Focused on retail strategy rather than core physical distribution practices like centralized warehousing or route optimization

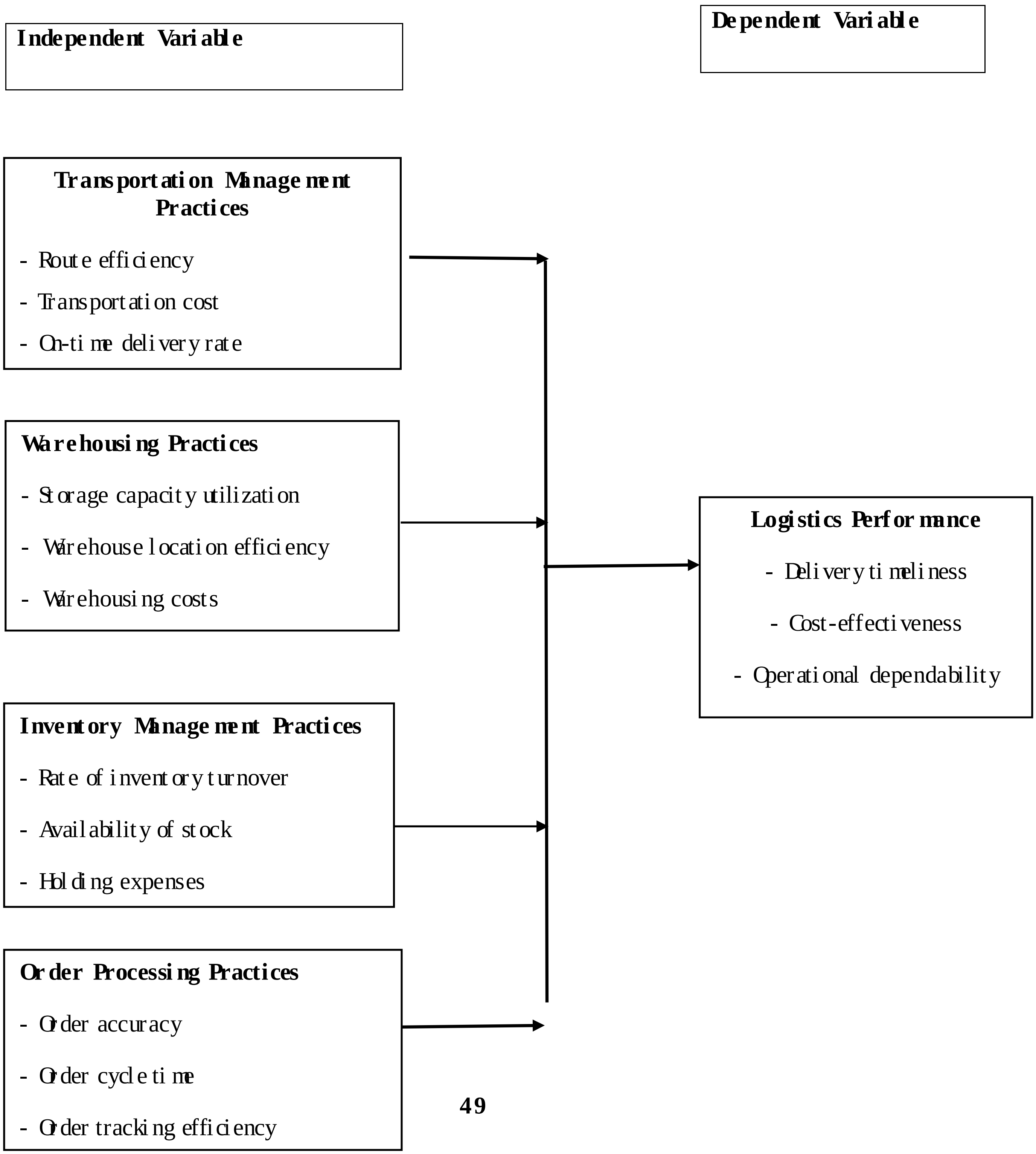
Muriuki, M, & Makhamara, M (2023).	Product innovation and operational performance at Kenya Breweries Limited	Descriptive survey design	Product innovation indirectly benefited from efficient distribution, enhancing performance	Lacked direct assessment of physical distribution practices; emphasis was on innovation, not logistics performance
Mbugua, A N, Ngugi, P. K, Thogori, M, & Mwangi, P. (2024).	Outbound logistics and performance of food and beverage manufacturing firms	Descriptive cross-sectional design	Outbound logistics practices improved performance in food and beverage firms	Did not assess inventory control and warehousing practices in depth; general focus lacked specificity to brewing industry dynamics

2.5 Conceptual Framework

A conceptual framework illustrates the logical structure and presumed relationships among the variables under investigation. According to Koob (2021), it represents the anticipated interrelationship between independent and dependent variables, often presented in a visual format to depict cause-and-effect linkages. The conceptual framework of this study seeks to evaluate the impact of physical distribution practices on logistics performance in the brewing industry in Kenya. The independent variables are: Transportation management, Warehousing practices, Inventory management practices and Order processing. The dependent variable is logistics performance defined in terms of delivery reliability, cost-efficiency, reduction in lead time, and customer satisfaction. This framework suggests that the efficiency and integration of practices in these distribution areas are significant factors in enhancing logistics performance in the brewing industry. This conceptual framework will also help inform the study's research objectives and questions to evaluate, and guide the overall process of data analysis.

Figure 2.1

Conceptual Framework Diagram Structure



2.6 Operationalization

Table 2.2

Operationalization of Independent and Dependent Variables

Variable	**Indicators**	**Measurement Items**	**Scale/ Measurement**
Independent Variables			
Transport Management Practices	Route Efficiency Transportation Cost On-time Delivery Rate	% of routes optimized for shortest time/distance Average transport cost per unit delivered % of orders delivered on or before scheduled time	5-point Likert scale / Ratio scale
Warehouse Practices	Storage Capacity Utilization	% of warehouse space utilized	5-point Likert scale / Ratio scale

	Warehouse Location Efficiency Warehousing Costs	Distance from warehouse to key markets/customers Average warehousing cost per unit	
Inventory Management Practices	Rate of Inventory Turnover Availability of Stock Holding Expenses	Inventory turnover ratio % of time stock is available on demand Average cost of holding inventory per unit/month	5-point Likert scale / Ratio scale
Order Processing Practices	Order Accuracy Processing Time Customer Query Handling	% of error-free orders processed Average order cycle time Rate of successful customer query resolutions	5-point Likert scale

Dependent Variable: Logistics Performance			
Delivery Timeliness	Order delivery lead time On-time delivery performance	Average number of days per delivery % of deliveries on schedule	Ratio scale / 5-point Likert scale
Cost-effectiveness	Distribution cost per unit Resource utilization efficiency	Total logistics cost divided by units delivered Perceived cost control by logistics staff	Ratio scale / 5-point Likert scale
Operational Dependability	Consistency of delivery Service interruption rate System reliability	% of orders delivered consistently Frequency of disruptions/errors Perception of dependable service	5-point Likert scale

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the research methodology for this study was explained. It described the research design, the population of interest, study sample frame and sampling techniques, data collection techniques or procedures, methods for analyzing data, and the other procedures involved in the execution of the methodology. The methodology was designed to produce sufficient data as guided by the aim of the study - to establish the effect of distribution practices on logistics performance in Kenya's brewing industry.

3.2 Research Design

As noted by Recker (2021), a research design is a systematic structure used to collect and analyze data to answer specific questions. In this investigation, a descriptive research design was used, as it allows for observing and analyzing phenomenon without exerting change in the study environment (Bandura, 2021).

The descriptive method was chosen as it can accurately and factually describe the physical distribution practices and logistics performance of the brewing firms. This method can show patterns, or relationships, between and among important physical distribution practices such as inventory management and transport management, warehouse practices and order processing where logistics outcomes are discussed such as delivery speed, service dependability, and cost effectiveness. A structured tool like a questionnaire will be used to collect data from a broad sample, which will provide comprehensive analysis and conclusions.

3.3 Sampling unit and Target Population

3.3.1 Sampling Unit

The sampling unit for this study comprised breweries operating in Kenya. The study focused on three major breweries Kenya Breweries Limited (EABL), Keroche Breweries, and Summit Breweries which represent a significant portion of Kenya's formal brewing market.

The choice of these three breweries was based on their market share, production capacity, and distribution network coverage (Kenya Association of Manufacturers, 2023). Kenya Breweries Limited is the industry leader with a national distribution footprint; Keroche Breweries is the largest indigenous competitor with regional dominance; and Summit Breweries represents the emerging medium-scale category. This selection ensured representation across the large, medium, and growing brewery segments in Kenya's brewing industry.

3.3.2 Target Population

According to Cooper and Schindler (2014), a population is defined as the entire set of elements or people that possess the relevant characteristics for a study. The target population consisted of employees in logistics, marketing, and management departments of the three breweries. These departments were selected because they directly influence and execute physical distribution decisions. However, it was recognized that company sizes vary. Kenya Breweries Limited, being the largest, has more employees than Keroche or Summit. Therefore, representation was focused on key personnel directly involved in logistics planning and execution, such as logistics managers, distribution supervisors, warehouse coordinators, and marketing officers responsible for customer order management. A total of 240 employees formed the target population 80 from each company to maintain balanced representation while accounting for operational scope and comparative analysis.

Table 3.1:

Target Population per Company and Department

Company	**Logistics Managers**	**Marketing Officers**	**Management Staff**	**Total**
Kenya Breweries Ltd	27	27	26	80
Keroche Breweries	27	26	27	80
Summit Breweries	26	27	27	80
Total	**80**	**80**	**80**	**240**

Source: Kenya Association of Manufacturers. (2023). KAM Annual Report 2023

3.4 Sample Design

3.4.1 Sample Frame

A sampling frame offered a comprehensive list or record of all the relevant participants within the targeted population (Lohr, 2021). For this research study, the sampling frame was provided by the logistics, marketing, and management sectors of top brewing organizations (Kenya Breweries Limited and Keroche Breweries), and in addition to their professional titles, it included any personnel who were involved in decision making related to distribution. This particular sampling frame assured the researcher that the frame was accurate, complete, and relevant to this study.

A sample is a subset of a population that has been selected for research and that is representative of the population (Lohr, 2021). As a result, it must have comparable characteristics with others in the selected target organization. Given the total population, there is a suggested approach for determining a reasonable or appropriate sample size necessary for this research project.

3.4.2 Sampling Technique

A simple random sample technique was utilized to minimize selection bias and guarantee that each individual in the frame of sampling had an equal probability of being chosen. 150 of the distinct IDs given to each name will be selected at random from a computer-generated database. In order to distribute questionnaires and obtain their voluntary participation, a selection of those involved were approached via phone and email.

3.4.3 Sample Size

Yamane's (1997) formula was applied to calculate the study's suitable sample size. Whenever the level of accuracy is known, this formula can be used to determine the sample size from a finite population.

$$n = \frac{N}{1 + N(e)^2}$$

n is required sample size

N is the population size =240

e is the level of precision =0.05

$$n = \frac{N}{\quad}$$

$$= \frac{240}{1+240(0.0025)}$$

$$= \frac{240}{1.6} = 150$$

For this investigation, a sample size of 150 respondents was employed. This size is reasonable and analytically sufficient for gathering data while preserving the required degree of precision and assurance. The data was collected from three brewing companies in Kenya: Kenya Breweries Limited, Keroche Breweries and Summit Lager Ltd. From each company, the study drawn 50 participants, distributed equally across three departments Logistics, Marketing, and Management as shown in the table below.

Table 3.2

Sample Size Distribution by Company and Department

Company	**Logistics Managers**	**Marketing Officers**	**Management Staff**	**Subtotal**
Kenya Breweries Ltd	17	17	16	50
Keroche Breweries	17	17	16	50

Company	Logistics Managers	Marketing Officers	Management Staff	Subtotal
Summit Lager Ltd	16	16	18	50
Total	**50**	**50**	**50**	**150**

Source: Kenya Association of Manufacturers (2023)

3.5 Instrumentation

Both primary and secondary sources of data were employed in this inquiry. While secondary data was gathered from reliable online sources, books, journals, and industry publications, primary data was gathered using questionnaires with solely closed-ended questions. The intent of the questionnaires was to get participants' concise, well-organized answers regarding the ways in which logistics performance in the Kenyan brewing sector is impacted by physical distribution measures like transportation, warehousing, and inventory control. The closed-ended questions also facilitate comparisons of responses and statistical analyses while still ensuring that the data obtained is reliable and interpretable.

3.5.1 Data Collection

The data collection method can be described as the systematic process of collecting information that fulfills the objectives and questions of the research (Baraldi & Bocconcelli, 2011). In the opinion of Cooper and Schindler (2014), it is a standardized method of procuring and structuring data so it can be analyzed and interpreted.

In this study, structured questionnaires were used to collect primary data from selected participants in the Kenyan brewing industry. The questionnaires comprised close-ended items, formulated with simple, easy to understand, concise language to facilitate comprehension and fast response.

The questionnaires were developed to measure the four main physical distribution practices: Warehouse management practices, Transport management practices, Inventory management practices and Order processing practices.

Responses were recorded using a 5-point Likert scale from: 1 = Strongly Disagree to 5 = Strongly Agree. The 5-point Likert scale permitted the participant to express the extent they agreed or differed with each statement, thus ensuring consistency and ease in analysis. The questionnaires were completed and distributed to participants in the selected three companies - Kenya Breweries Limited, Keroche Breweries, and Summit Lager Ltd.

Research instruments are the tools and techniques used in the study to collect data. Both quantitative and qualitative data were collected for this experiment. The main tool utilized to collect data was a questionnaire. The questionnaires that will make up the study contained both closed-ended and open-ended items.

3.5.1 Data Analysis Techniques

According to Cooper and Schindler (2014), data analysis involves systematically examining and transforming collected data into meaningful information that can answer research questions and test hypotheses. In this study, both descriptive and inferential statistical techniques were employed to analyze data in line with the study objectives.

Descriptive statistics such as means, standard deviations, frequencies, and percentages were used to summarize data and describe the characteristics of respondents and study variables. Inferential statistics, specifically correlation and multiple regression analysis, were used to determine the relationship between physical distribution practices and logistics performance in the Kenyan brewing industry.

The analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 25. The regression analysis tested the combined and individual effects of independent variables direct distribution, warehousing management, inventory control, and outsourcing of transportation services on the dependent variable, logistics performance.

The regression model for the study was expressed as follows:

$$Y=\beta 0+\beta 1\,X1+\beta 2\,X2+\beta 3\,X3+\beta 4\,X4+\varepsilon$$

Where:

Y = Logistics Performance

X1 = Direct Distribution Practices

X2 = Warehousing Management

X3 = Inventory Control

X4 = Outsourcing of Transportation Services

β0 = Constant term

β1, β2, β3, β4= Coefficients of respective independent variables

ε = Error term

3.5.1 Diagnostic Tests

Before performing regression analysis, diagnostic tests were conducted to ensure that the assumptions of the classical linear regression model were not violated. These included:

3.5.1.1 Normality Test

The normality of the data was assessed using the Kolmogorov–Smirnov test and Shapiro–Wilk test, alongside graphical methods such as histograms and Q–Q plots.

A p-value greater than 0.05 indicated that the data were normally distributed.

3.5.1.2 Multicollinearity Test

The Variance Inflation Factor (VIF) and Tolerance values were used to test for multicollinearity among independent variables.

VIF values less than 10 and tolerance values above 0.1 signified that multicollinearity was not a concern.

3.5.1.3 Heteroscedasticity Test

The Breusch–Pagan test was applied to examine whether the variance of residuals was constant (homoscedastic).

A p-value greater than 0.05 indicated homoscedasticity and that the assumption of equal variance was not violated.

3.5.1.4 Autocorrelation Test

The Durbin–Watson statistic was used to detect the presence of autocorrelation in residuals.

Values close to 2 indicated the absence of autocorrelation.

3.5.1.5 Linearity Test

Scatter plots of standardized predicted values against standardized residuals were examined to confirm a linear relationship between independent and dependent variables.

3.5.2 Model Significance Testing

The overall significance of the model was tested using the Analysis of Variance (ANOVA) at a 95% confidence level ($\alpha = 0.05$). The coefficient of determination (R^2) indicated the proportion of variance in logistics performance explained by physical distribution practices. The significance of individual coefficients was assessed using t-tests and corresponding p-values.

The regression model provided an empirical basis to determine how each physical distribution practice direct distribution, warehousing, inventory control, and outsourcing affects logistics performance in the Kenyan brewing industry.

3.6 Pilot Study

A pilot study was conducted with 20 respondents drawn from various departments within Kenya Breweries Limited, including logistics, marketing, and management. The choice of 15 participants ensured a manageable yet diverse representation across key functional areas, allowing for reliable preliminary insights while keeping data collection feasible. Methodological scholars recommend that a pilot study should constitute at least 10% of the intended sample size, which is considered adequate for detecting ambiguities and testing reliability (Mugenda & Mugenda, 2003; Johanson & Brooks, 2010). The sample size was therefore sufficient to capture meaningful feedback and test the robustness of the instrument without overstretching resources.

The primary aim of the pilot was to assess the clarity, coherence, and relevance of the questionnaire items in order to ensure that they are easy to understand, logically arranged, and appropriately aligned with the research objectives. While piloting, respondents completed the questionnaire and provide feedback on any unclear, ambiguous or redundant items. This qualitative feedback assisted in identifying and rectify the issues prior to administering the final instrument.

3.7 Validity

Content validity was established through expert judgment. The initial questionnaire was reviewed by academic professionals in supply chain management and logistics and industry practitioners in the brewing sector. Their insights ensured that the instrument adequately represented the key constructs of the study namely, physical distribution practices and logistics performance.

The experts assessed each item for relevance, clarity, and completeness. Revisions were made to incorporate suggestions, remove redundancies, and improve item phrasing. This process enhanced the questionnaire's ability to capture the constructs being studied comprehensively.

To establish construct validity, each item was aligned with theoretical frameworks and empirical literature guiding the study. This ensured that the instrument not only covered all conceptual aspects of the variables but also adhered to established research standards. The clarity and logical grouping of items improved overall coherence and the interpretability of findings.

3.8 Reliability

Reliability evaluated how consistently the instrument's findings held up over time. Internal consistency and test-retest reliability were the two types of reliability that were looked at in this study. Cronbach's alpha will be used to determine internal consistency; a coefficient of $\alpha > 0.70$ was deemed acceptable. Weak items have been discovered and revised using the item-total correlation and "alpha if item deleted" approaches if a scale yields a lower alpha. The Intraclass Correlation Coefficient (ICC) for multi-item constructs was computed using the data from the pilot study to evaluate test-retest reliability. Acceptable reliability over time is shown by ICC values of 0.70 or more.

The final questionnaire is accurate, consistent, and suitable for gathering data in the Kenyan brewing business, according to the combined findings of validity and reliability evaluations. This thorough procedure increased the validity of the study's conclusions. Logistics employees will be scheduled in small groups and invited via business email to ensure a comprehensive debriefing on any ambiguities found. The combined validity and reliability evaluations are expected to yield an instrument with unique, representative items that consistently measure each construct, offering a solid foundation for the subsequent comprehensive survey of 150 respondents from the Kenyan brewing industry.

3.9 Ethics in Research

Ethical integrity was upheld throughout the study. Approval was obtained from relevant academic and company authorities prior to data collection. Participation was voluntary, and informed consent was obtained from all respondents.

Confidentiality and anonymity were guaranteed no names or identifiable information were recorded. Data were securely stored and used solely for academic purposes. Participants were assured that withdrawal from the study at any point would have no consequences. The researcher adhered to the KCA University Research Ethics Policy and the general ethical principles of respect, beneficence, and justice.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the study's analysis and findings, which examine effect of physical distribution practices on logistics performance in the Kenyan brewing industry. This chapter covers the data analysis, study findings, and result interpretations.

4.2 Response Rate

The study had a total sample size consisting of 150 respondents selected from the management, marketing, and logistics departments of three brewing companies. Of all the respondents who received a structured questionnaire survey, 128 were returned and filled out, which resulted in a response rate of 85.33%. This rate of response is extremely beneficial to the reliability and validity of the findings because it helped ensure an adequate representation of the entire study population, and minimized non-response errors (Elliott, 2024).

The response rate achieved for this study is considered highly satisfiable when compared against established standards. According to Kothari (2011), a response rate of 50% is adequate, 60% is good and anything above 70% is very good for data analysis. As such, the response rate of 85.33% that was achieved in this study exceeded all thresholds, and provides confidence of the strength and generalizability of the results. A summary of the response rate for this study is presented in Table 4.1.

Table 4.1 Response Rate

Response Rate	Frequency	Percentage
Responded	128	85.33
Non-responded	22	14.67
Total	**150**	**100**

4.3 Demographic Information's of Respondents

The demographic characteristics of the participants adds context to how the results may be interpreted. For the evaluation of the data, variables such as gender, education level, position or role within the brewery and work experience were taken into consideration.

4.3.1 Gender of the Respondents

The study aimed to determine the gender of the respondents as part of the demographic information collected to provide a clearer understanding of the sample population. From the results in Table 4.2, majority of the respondents 71(55.5%) of the respondents were male and 57(44.5%) of them were female. This demographic profile provides an important lens for interpreting the study results. The higher proportion of male respondents reinforces the perception that brewing in Kenya, particularly in logistics and management remains largely male-driven. This trend is consistent with emerging shifts in the East African manufacturing workforce, where women are gradually taking on more roles in previously male-dominated industries (ILO, 2022).

Table 4.2 Gender of the Respondents

Gender	Frequency	Percentage
Male	71	55.5

Female	57	44.5
Total	128	100.0

4.3.2 Level of Education of the Respondents

The study aimed to determine the level of education of the respondents, and as summarized in Table 4.3, the results present the educational attainment of the participants as part of their demographic characteristics.

Table 4.3 Level of Education of the Respondents

Level of Education	Frequency	Percent
Secondary	10	7.8
College	27	21.1
Undergraduate	78	60.9
Postgraduate	13	10.2
Total	128	100.0

The findings indicated that the majority of the respondents, 78(60.9%) had attained an undergraduate degree while 27(21.1%) had achieved college-level education. Finally, 13(10.2%), reported having a postgraduate qualification whereas 10(7.8%) had completed secondary education. From these findings, it became clear that most of those who completed the survey had degrees beyond those associated with school leaving, which tends to mean undergraduate degrees. This may reflect the educational background often required to be employed in the brewing industry.

4.3.3 Role of the Employee in the Firm

The purpose of the study was to determine the part of employees in the firm by identifying the roles and responsibilities of individuals where as in Table 4.4, the results depicted the categorization of the respondents based on their function or role in the organization.

Table 4.4 Role of the Employee in the Firm

Role of the Employee	Frequency	Percent
Logistics Officer	44	34.4
Marketing officer	55	43.0
Management officer	29	22.7
Total	128	100.0

The results indicate that the largest number of the respondents, n=55 (43.0%) were marketing officers and the second-highest number were logistics officer n=44 (34.4%). The least number of respondents, n=29 (22.7%) were classified as management officers. The distribution of that number of participants was mostly to recruit for marketing and logistics functions which are primary in operations within the brewing industry and a slight reduction in participants that performed management functions.

4.3.4 Years of Work in Brewing Company

The study aimed to determine the number of years the respondents had worked in the brewing company, and as presented in Table 4.5, the results illustrate the distribution of employees according to their length of service.

Table 4.5 Years of Work in Brewing Company

Years of Work in Brewing Company	Frequency	Percent
Less than 1 Year	26	20.3
1 - 3 Years	56	43.8
4 - 6 Years	39	30.5
More than 6 Years	7	5.5
Total	**128**	**100.0**

The findings show that the majority of respondents, 56(43.8%) had worked in the company for between 1 and 3 years while 39(30.5%) had a service length of 4 to 6 years. Another 26(20.3%) had worked for less than one year and only 7(5.5%) reported more than 6 years of experience.

These results suggest that most of the employees were relatively new to the company, with the highest concentration having less than 6 years of service, which may reflect recent recruitment trends or a youthful workforce structure within the brewing industry.

4.4 Descriptive Analysis

The impact of each physical distribution method on logistics performance was assessed using descriptive statistics, such as frequency, means and standard deviations. A 5-point Likert scale (1 being strongly disagree and 5 being strongly agree) was used to gauge responses. Below is a summary of the findings for every variable.

4.4.1 Transport Management Practices

Transportation management practices were assessed using metrics such as route optimization, performance measurement, and the impact on logistics performance. Analysis of the response mean scores was conducted on the continuous scale <1.5 represents strongly disagree; with 1.5-2.4 disagree; while 2.5-3.4 neutral; with 3.5- 4.5 being agree and finally >4.5 represented strongly agree. The standard deviation of below 2 indicates that a few of the respondents deviated from the mean. The results were as presented in Table 4.6.

Table 4.6

Transport Management Practices

Item Statement		**SD**	**D**	**N**	**A**	**SA**	**Mean**	**Std Dev**
1. Our company utilizes transport planning strategies to optimize delivery routes.	F	16	18	2	52	40	3.64	1.38
	%	12.5	14.1	1.6	40.6	31.3		
2. Transport performance is measured using indicators like delivery time and cost.	F	10	19	2	56	41	3.77	1.26
	%	7.8	14.8	1.6	43.8	32.0		
3. Transport management practices have improved our logistics performance.	F	13	18	7	54	36	3.64	1.30
	%	10.2	14.1	5.5	42.2	28.1		
Overall Mean							**3.68**	**1.31**

The overall mean score for transport management practices was 3.68, with a standard deviation of 1.31. This implies that the respondents found that transport management practices are generally positive contributors to the logistics performance. The standard deviation is less than 2 indicating that there is only a minor number of respondents who do not follow the general perception implying that there is a relatively consistent level of agreement among the sample.

The study results in Table 4.6 indicated that 92(71.9%) of the respondents agreed that their company utilizes transport planning strategies to optimize delivery routes while 34(26.6%) disagreed that their company utilizes transport planning strategies to optimize delivery routes. The mean of 3.64 suggests that respondents agreed that transport planning strategies optimize delivery routes. The standard deviation of 1.38, which is below 2, indicates that a few of the respondents deviated from the mean of 3.64. Findings agreed with Gideon,(2024) who showed that the traditional algorithm takes longer to find the correct way than the algorithm developed this time. Finally, the simple logistic distribution optimization method model and the soft time-limited logistic distribution processing optimization model are calculated and simulated by the genetic testing algorithm and genetic algorithm development.

Similarly, 97 (75.8%) of the respondents agreed that transport performance is measured using indicators like delivery time and cost. Conversely, 29 (22.6%) disagreed with the statement, suggesting that while the majority acknowledged these metrics as critical, there remains a minority that may consider other parameters such as vehicle utilization rates, fuel efficiency, or service reliability equally important. With a mean of 3.77, the findings indicate overall agreement that delivery time and cost are central to measuring transport performance. The standard deviation of 1.26, which is below the threshold of 2, further implies that only a small proportion of respondents significantly deviated from the overall perception.

This finding agrees with Wubet (2022), who indicated that delivery efficiency and transportation costs are crucial in logistics, especially for construction project deliveries, which are important KPIs when evaluating vehicle movements and their associated costs. In the same vein, Gideon (2024) noted that in Kenya's textile industry, indicators concerning transport performance, such as timely delivery and cost reductions, have a definite effect on customer satisfaction and organizational competitiveness. Taken together, this illustrates that delivery time and cost are both theoretical measures and practical performance indicators across industries.

The global emphasis on delivery speed and costs as performance measures is familiar. For example, Chopra and Meindl (2021) stated that efficient transport systems keep logistics costs down while maximizing delivery reliability, which builds customer trust and loyalty, ensuring repeat purchases. In the brewing sector of the economy, where timely deliveries impact the ability to stock perishable or high-demand products like beer, delivery speed becomes all the more critical to maintaining market share. Any delayed deliveries may lead to empty shelves at retail outlets, lost sales, and lost brand loyalty.

Beyond costs and time, recent studies indicate modern performance measurement of transport systems includes an evaluation of sustainability and digitalization. For example, Ruxho (2022) mentioned that the characterizing of transport practices to include sustainable practices shortens fuel consumption costs, which also improves reputations for firms. Also, many breweries and logistics companies may utilize route optimization software or GPS system to monitor the delivery in real time, reduce idle time, and decrease lateness of deliveries, all of which may lead to costs reduction or increased reliability at times.

The disagreement among respondents (22.6%) may reflect contextual differences among organizations around how they prioritize an indicator. For smaller organizations, flexibility and reliability may be valued over cost indicators, while larger organizations can implement data-driven systems for more complex and detailed data metrics, including vehicle turnaround times, tetra pack damages, or fuel economy. These differences support the need for breweries and other manufacturers in Kenya to consider a more integrative performance measurement approach to evaluate organizations on traditional indicators, including cost and time, variables being investigated under sustainability, digitalization, and quality of service.

Further, 90(70.3%) of the respondents agreed that transport management practices have improved logistics performance. Further, 31(24.3%) disagreed that transport management practices have improved logistics performance. The mean of 3.64 indicates that respondents agreed that transport management practices have improved logistics performance. The standard deviation of 1.30, which is below 2, indicates that a few of the respondents deviated from the mean of 3.64. Findings are consistent with the study done by Omoush, (2022) logistic management practices have a considerable positive impact on its dimension (inventory management, warehousing, order process management, transportation and packaging) on the operational performance of road transport companies.

4.4.2 Warehousing Practices

Warehousing practices were evaluated based on warehouse layout efficiency, contribution to order fulfillment, and challenges such as space constraints. Analysis of the response mean scores was conducted on the continuous scale <1.5 represents strongly disagree; with 1.5-2.4 disagree; while 2.5-3.4 neutral; with 3.5-4.5 being agree and finally >4.5 represented strongly agree. The standard deviation of below 2 indicates that a few of the respondents deviated from the mean. The results were as presented in Table 4.7.

Table 4.7:

Warehousing Practices

Item Statement		SD	D	N	A	SA	Mean	Std Dev
1. Our warehouse layout and design support efficient storage and retrieval.	F	8	29	6	45	40	3.63	1.30
	%	6.3	22.7	4.7	35.2	31.3		
2. Warehousing practices contribute to timely order fulfillment.	F	11	20	9	50	38	3.66	1.29
	%	8.6	15.6	7.0	39.1	29.7		
3. We face warehousing challenges such as space constraints or outdated equipment.	F	13	20	7	58	30	3.56	1.28
	%	10.2	15.6	5.5	45.3	23.4		
Overall Mean							**3.61**	**1.29**

The mean rating of warehousing practices was 3.61 and the standard deviation was 1.29. This means that the respondents had a general consensus that warehousing practices have a positive contribution to logistics performance. The standard deviation being less than 2 indicates that the respondents who did not follow the general perception were few also meaning that there was a fairly steady inclination of the respondents towards the overall perception.

The study results in Table 4.7 indicated that 85(66.5%) of the respondents agreed that their warehouse layout and design support efficient storage and retrieval while 37(29.0%) disagreed that their warehouse layout and design support efficient storage and retrieval. The mean of 3.63 suggests that respondents agreed that warehouse layout and design enhance storage and retrieval. The standard deviation of 1.30, which is below 2, indicates that a few of the respondents deviated from the mean of 3.63. Findings concur with Al Nashmi, (2024) reveal that slotting optimization reduces travel time by up to 30%, while zoning strategies enhance order picking speed by 40%. Advanced technological interventions, such as robotics and simulation models, further improve efficiency and accuracy while mitigating operational bottlenecks.

Similarly, 88 (68.8%) of the respondents agreed that warehousing practices contribute to timely order fulfilment. In addition, 31 (24.2%) respondents disagreed with the statement that warehousing practices lead to timely order fulfillment. The means of 3.66 demonstrates that at least a majority agreed with the statement that warehousing practices lead to timely order fulfillment. The Standard Deviations is 1.29, which is below 2, indicates that only a few respondents deviated from the mean of 3.66. This indicates that while the majority agree that warehousing is essential to order fulfilment, some probably noted experiences where other aspects, such as transportation delays, stock outs, or issues with suppliers, overwhelmed warehousing's capacity to facilitate timely deliveries.

These study findings align with Alsoussi (2025), who indicated that, from a business perspective, order processing activities in warehouses and distribution centers, shorthand distribution processes to ensure flexibility while achieving transparency, and customer-oriented, exceptional customer service support meeting customer expectations. All of which point to warehousing as not solely about storage but about creating efficiencies of movement of goods, accurate record keeping of inventory, and reliable dispatch systems, all guaranteeing that the product arrives to the customer on time.

In addition, warehousing practices comprise effective utilization of space, the use of automation, and real-time tracking, all of which are meant to avoid impediments to the movement of large quantities of merchandise. In rapidly moving industries, such as brewing, delays in sorting, packing, or dispatching means late delivery times and disappointed customers. Thus, warehouses, that engage with supply chain management practices, like the use of Warehouse Management Systems (WMS), and/or automated order picking can be extremely responsive to customer orders.

Furthermore, the opposition expressed by 24.2% of respondents could indicate that some organizations are in situations where warehousing alone does not equate to timely fulfilment. For instance, even if goods are stored well, and the warehousing function is efficient in processing goods, if transporting goods to their destination by road is insufficient, or if the distributor is not informed in advance, there is every possibility of significant delay. This raises the issue of logistics, specifically the need to integrate warehousing with transport networks, inventory control, and order processing.

In addition, the earliest ramifications of warehousing towards timely order fulfilment extends beyond efficiency and logistics. Warehouses that are strategically located near demand clusters, transport corridors, or production sites can decrease lead times and improve delivery consistency. In Kenya's brewing industry for example, warehouses located along key transport corridors such as the Nairobi – Mombasa highway, can allow a brewery to better penetrate both urban and rural markets.

Another major reason cited involved the increasing role of technology and sustainability in warehousing practices. Technology-based solutions such as barcode scanning, RFID tracking, and predictive analytics help to ensure that stock accuracy occurs, as well as avoidance of stock outs or delays. Sustainable warehousing principles such as green storage and energy-efficient methods of operation are increasingly prominent; while the focus is primarily on environmental sustainability and responsibility for adopting green storage methods, they can also benefit efficiency through waste minimization and streamlining operations.

In addition, 88 (68.7%) of respondents agreed that they face warehousing problems such as constrained space and/or outdated equipment while 33 (25.8%) disagreed that they face warehousing problems such as constrained space and/or outdated equipment. The mean of 3.56 suggests that respondents generally agreed that warehousing problems exist in their firms. The standard deviation of 1.28, which is below 2, indicates that a few of the respondents deviated from the mean of 3.56. Results concurred with those of Tulli (2023), who discovered that staff training, expert consultations, and a variety of creative solutions —such as the use of warehouse organization systems with a racking truck, a warehouse control system with barcodes, a raw material oversight program, an application Pick by Voice system, MRP and ERP systems, ABC, JIT, and the Lean methods —are necessary to address the issues with LMC warehousing processes and implement improvements.

4.4.3 Inventory Management Practices

Inventory management practices were evaluated using inventory tracking systems, demand forecasting and inventory management practices and the impact on logistics performance. Analysis of the response mean scores was conducted on the continuous scale <1.5 represents strongly disagree; with 1.5-2.4 disagree; while 2.5-3.4 neutral; with 3.5- 4.5 being agree and finally >4.5

represented strongly agree. The standard deviation of below 2 indicates that a few of the respondents deviated from the mean. The results were as presented in Table 4.8.

Table 4.8

Inventory Management Practices

Item Statement		SD	D	N	A	SA	Mean	Standard Deviation
1. We use inventory tracking systems to maintain stock accuracy.	F	9	23	8	53	35	3.64	1.25
	%	7.0	18.0	6.3	41.4	27.3		
2. Demand forecasting is used to plan inventory levels.	F	12	11	7	57	41	3.81	1.24
	%	9.4	8.6	5.5	44.5	32.0		
3. Our inventory management practices reduce stock outs and excess inventory.	F	16	20	2	44	46	3.66	1.42
	%	12.5	15.6	1.6	34.4	35.9		
Overall Mean							**3.70**	**1.31**

The average for inventory management practices was 3.70 and standard deviation was 1.31. This implies that the respondents mostly believed that inventory management practices improve the performance of logistics. The standard deviation of less than 2 indicates that the number of respondents that differed with the overall perception is small implying that there was relatively a strong agreement within the sample.

The study results in Table 4.8 indicated that 88(68.7%) of the respondents agreed that their firms use inventory tracking systems to maintain stock accuracy while 32(25.0%) disagreed that their firms use inventory tracking systems to maintain stock accuracy. The mean of 3.64 suggests that respondents agreed that inventory tracking systems support stock accuracy. The standard deviation of 1.25, which is below 2, indicates that a few of the respondents deviated from the mean of 3.64. Findings concur with Bakri, (2025) indicate a 30% improvement in stock Opname accuracy, a 60% reduction in inventory discrepancies, and a 50% decrease in reconciliation time. Additionally, businesses implementing AI and Block chain experienced a 15% increase in sales performance and a 67% reduction in stock- out issues.

Similarly, 98 (76.5%) of the respondents agreed that demand forecasting is used to plan inventory levels. Further, 23 (18.0%) disagreed that demand forecasting is used to plan inventory levels. With a mean of 3.81, the findings show that respondents agreed with the statement that demand forecasting helps in planning inventory levels. With a standard deviation of 1.24 being below 2, there are some respondents who varied from the mean of 3.81. In other words, while most respondents recognized the value of forecasting to manage inventory, there were some respondents who were more reliant on reactive and/or experiential methods versus forecasting. The findings of this study were in agreement with Clark and Mertens' (2024) study indicating that some forecasting methods have lower forecast accuracy than standard quadratic loss functions with losses in forecast accuracy exceeding as high as 9%. This also indicates that one of the most difficult problems with demand forecasting is although a valuable tool and significant aspect of inventory planning (i.e., forecasting product demand), its usefulness is highly dependent on the parameters selected, the data used, and the uncertainty in the environment. For example, in the brewing industry, demand is affected by the seasons, holidays, and social gatherings where the ability to forecast sales is needed in order to prevent understocking and/or overstocking and the problems that arise from both scenarios. Understocking will result in lost sales given that consumers are unable to purchase desired products, while overstocking ties up capital and increases the owner's and consumers' storage costs. Demand forecasting provides a structured solution to achieve balance between under and overstocking by matching production and inventory to probable market demand.

The disagreement expressed by some of the participants may reflect operational realities based in Kenya, where external factors can affect forecasts meaning that unreliable supply chains, unreliable infrastructure, and unexpected events (specific political events or unfavorable market conditions on supply) can cause forecasts with which firms can have less reliance on. In this case, firms may have to just maintain safety stocks or use a flexible method of the replenishment process when they do not have full confidence in forecasts.

Other studies support the idea of demand forecasting with inventory. Otieno et al (2021) reported that demand forecasting in the drinks manufacturing industry for Kenya was associated with improvements in order fulfillment and had reduced incidences of stock-outs. Chandran (2021) discovered, for example, that utilizing technological tools like enterprise resource planning (ERP) units for demand forecasting improved the accuracy of price-based demand forecasting, as well as improvements in real-time inventory management. Bilal et al (2023) for example, used an inventory system to suggest the combination of a forecasting mechanism with safety stock policies solutions outlined which can assist firms to respond to uncertainty in the external environment.

From the viewpoint of strategy, demand forecasting is not just a means of using data to plan but is also a major source of competitive advantage. Firms that forecast effectively can reduce lead times, optimize production schedules, and improve customer satisfaction by ensuring consistent product availability. In the brewing sector, where consumer loyalty is tied to brand consistency and availability, accurate demand forecasting becomes a key driver of logistics efficiency and market competitiveness.

Further, 90(70.3%) of the respondents agreed that their inventory management practices reduce stockouts and excess inventory. However, 36(28.1%) disagreed that their inventory management practices reduce stock outs and excess inventory. The mean of 3.66 indicates that respondents agreed that inventory practices minimize both stock outs and excesses. The standard deviation of 1.42, which is below 2, indicates that a few of the respondents deviated from the mean of 3.66. Findings concur with Tamiru (2022) found that inventory shrinkage, inventory investment and inventory turnover affects the competitiveness of Safaricom Ltd.

4.4.4 Order Processing Practices

Order processing practices were evaluated based on accuracy, processing time, and impact on customer satisfaction. Analysis of the response mean scores was conducted on the continuous scale <1.5 represents strongly disagree; with 1.5-2.4 disagree; while 2.5-3.4 neutral; with 3.5- 4.5 being agree and finally >4.5 represented strongly agree. The standard deviation of below 2 indicates that a few of the respondents deviated from the mean. The results were as presented in Table 4.9.

Table 4.9

Order Processing Practices

Item Statement		SD	D	N	A	SA	Mean	Standard Deviation
1. Customer orders are processed accurately and on time.	F	17	12	4	60	35	3.66	1.33
	%	13.3	9.4	3.1	46.9	27.3		

2. Our order processing system supports real-time tracking and confirmations.	F	7	25	4	49	43	3.75	1.26
	%	5.5	19.5	3.1	38.3	33.6		
3. Efficient order processing has helped improve our customer satisfaction.	F	14	18	3	56	37	3.66	1.32
	%	10.9	14.1	2.3	43.8	28.9		
Overall Mean							**3.69**	**1.31**

The total average score on order processing practices was 3.69 with a standard deviation of 1.31. This implies that most respondents accepted the fact that order processing practices lead to favorable logistics performance. The standard deviation is less than 2 indicating that not many respondents differed with the mean creating uniformity in responses.

The study results in Table 4.9 indicated that 95 (74.2%) of the respondents agreed that customer orders are processed accurately and on time, while 29 (22.7%) disagreed. The mean of 3.66 suggests that respondents generally agreed with the statement that customer orders are processed accurately and on time. The standard deviation of 1.33, which is below 2, indicates that only a few respondents deviated from the mean of 3.66, suggesting a relatively strong consensus. These findings are consistent with Ravula (2022), who demonstrated that longer order processing and delivery times are associated with lower customer ratings. Delays in fulfilling orders not only lead to immediate customer dissatisfaction but also create long-term negative perceptions that affect brand loyalty. Ravula further noted that late delivery of an order is negatively associated with ratings and that the order cost amplifies this effect, as customers are less forgiving when they pay higher prices but still experience poor service. Interestingly, freight cost was shown to reduce both the negative effect of late delivery and the positive effect of early delivery, suggesting that customers may perceive shipping fees as a buffer against service expectations. The same study also highlighted curvilinear relationships between customer ratings and delivery timeliness, where both late and excessively early deliveries can impact customer satisfaction, albeit in different ways.

The current study reinforces these conclusions within the context of Kenya's brewing sector. Timely and accurate order processing ensures that distributors and retailers have sufficient stock to meet consumer demand, especially during peak periods such as festive seasons and public holidays when consumption of alcoholic beverages typically spikes. Inaccurate order processing can lead to stock-outs at retail locations, missed sales opportunities, and deteriorating relationships between breweries and distributors. Other studies corroborate this finding. Mwangi (2023) found that utilizing an automated process and an Enterprise Resource Planning (ERP) approach to order processing increases accuracy of the order process. Similarly, Kimani, and Wekesa (2022) suggest that a standardized order management system streamlines order processing time and increases communication and coordination between the production and distribution units. Evidence on a global level is also supportive of this as Oliveira & Silva (2021) concluded that beverage companies in Brazil that embedded Customer Relationship Management (CRM) systems with odder tracking experienced improvements in delivery reliability and customer satisfaction as a result in decrease of complaints related to getting the wrong order or experiencing delays in getting orders.

The small percentage of respondents (22.7%) who didn't favor this may suggest the continued difficulties that impede order processing, including a lack of communication between departments, down-time periods for systems, and logistical delays whilst in transport or warehousing. Orders are regularly processed at a brewery in Kenya along with order information for delivery, however, factors relating to infrastructure, such as road conditions, traffic congestion and ruptures in the supply chain can lead to delays before the order can ultimately reach the final customer after processing. From a strategic position, the results indicate that breweries and all actors in the supply chain must continue to make capital investments into digital tools and automated systems to strengthen the order processing system's quality, accuracy and timeliness. Furthermore, training staff on the procedures for handling orders; standardizing the order format; having the order processing system integrated with demand forecasting functions can lessen errors and delays. As an end result, breweries have the potential to provide quality customer satisfaction and better positioning in the market due to reliable and regular delivery from service systems.

Similarly, 92(71.9%) of respondents agreed that their order processing system provides delivery tracking and confirmations of its order in real time whilst 32(25.0%) do not agree that their order processing system provides delivery tracking and confirmations of its order in real time. The respondents also agreed that their order processing system supports real-time tracking and confirmations with a mean of 3.75. The standard deviation of 1.26, which is below 2, indicates that a few respondents deviated from the mean of 3.75. The study findings agreed with Saha, Aqlan, Lam and Boldrin, (2016) proposes an End-to-End Customer Order Management System (E2E COMS) focusing on effective utilization of individual and shared resources to support real-time order management and mitigate risk of managing diverse missions. The proposed system consists of three integrated tools: Order Prioritization Tool (OPT) to assess and prioritize customer orders for each business channel, Order Fulfillment Progress Projection Tool (OFPPT) to predict the expected remaining order completion time considering inventory and resource capacity constraints and risk mitigation tool to assess the risk of missing an order shipment due to shipping constraints.

Further, 93(72.7%) of the respondents agreed that efficient order processing has helped improve customer satisfaction whereas 32(25.0%) disagreed that efficient order processing has helped improve customer satisfaction. The mean of 3.66 indicates that respondents agreed that order processing contributes to customer satisfaction. The standard deviation of 1.32, which is below 2, indicates that a few respondents deviated from the mean of 3.66. Results agreed with Topalović, (2015) highlight the importance of top management's dedication, civility, and duty to our clients in ensuring their pleasure.

4.4.5 Logistics Performance

Logistic performance was evaluated based on transport distribution practices, inventory and warehousing practices, transport and ordering processes as shown in the table below. Response mean rating assessment was executed using an ongoing scale: <1.5 means strongly disagree, 1.5-2.4 means disagree, 2.5-3.4 means neutral, 3.5-4.5 means agree, and >4.5 means highly agree. The standard deviation of below 2 indicates that a few of the respondents deviated from the mean. The results were as presented in Table 4.10.

Table 4.10

Logistics Performance

Item Statement		SD	D	N	A	SA	Mean	Standard Deviation
1. Our physical distribution practices have improved overall logistics performance.	F	6	18	3	52	49	3.94	1.18
	%	4.7	14.1	2.3	40.6	38.3		
2. Inventory and warehousing practices enhance supply chain responsiveness.	F	11	13	6	51	47	3.86	1.26
	%	8.6	10.2	4.7	39.8	36.7		

3. Transport and order processing practices reduce delivery lead times and errors.	F	4	12	6	70	36	3.95	1.00
	%	3.1	9.4	4.7	54.7	28.1		
Overall Mean							**3.92**	**1.15**

The general average score of logistics performance is 3.92 with a standard deviation of 1.15. This showed that the respondents were in agreement with the fact that logistics performance has improved due to increase in the distribution, inventory, warehousing and order processing practices. The fact that the standard deviation is less than 2 indicates the consistency in the responses with a limited number of deviations.

The findings presented in Table 4.10 reveal that 101 (79.0%) of the respondents indicated agreement with the claim that physical distribution practices enhanced logistics performance overall, while 24 (18.8%) disagreed. The overall mean of 3.94 indicates that respondents agreed on the premise that physical distribution practices enhanced logistics performance. The standard deviation of 1.18 indicates that relatively few respondents deviated from the mean of 3.94, and reflects a fairly strong level of consensus among participants. The results are congruent with the findings of Maina and Wachiuri (2024) who found a positive and significant effect of order fulfilment on logistics firms' performance in Nairobi City County. This indicates that the implications of physical distribution practice were among the core areas where logistics organizations reported positive implications associated with journey orders in ways that led to customer satisfaction, cost savings for improved production efficiency, and improvements in the reliability of deliveries.

Physical distribution practices, by allowing goods to flow smoothly from production sites and stores to end customers, act as the mainstay of coordinating any logistics system. Efficient transportation systems decrease lead times and cost, strategic warehousing enhances access to market, and sophisticated order processing guarantees accuracy and timely delivery. Together, these practices provide an integrated framework for achieving the greater overall agility and responsiveness referred to by logistics firms. In the brewing industry, where demand is often highly seasonally volatile and geographically dispersed, effective distribution practices guarantee continuous product supply in urban and rural locations in both markets. Empirical research reinforces this intuitive connection. Gideon (2024) indicated recently that enhancing routing and fleet utilization practices led to improved transport choices and overall organizational performance for Kenyan manufacturing firms. Lindsay (2023) noted that strategically located warehouses along major transport corridors led to more timely product delivery while reducing delays and logistical challenges. At the global level, Richards and Grinsted (2022) indicated that beverage companies employing advanced distribution technologies, such as GPS-facilitated fleet management systems and automated warehouses, led to improved reliability in delivery and substantial reductions in customer complaints.

The 18.8% of respondents that disagreed, likely represent contexts where organizations are operating in the face of persistent external challenges, such as poor infrastructure, unexpected fuel costs, and burdensome regulation, and these challenges may prevent a firm form fully realizing its potential associated with physical distribution practices. Even when these internal systems are structured appropriately, external constraints can lower the efficiency of logistics. For example, road congestion and other delays at ports or border posts in East Africa often negate the advantages of a well-defined warehouse and inventory system.

From this strategic perspective, the findings indicate that companies should consider physical distribution as an operational necessity and also a source of competitive advantage. Firms that invest in modern technologies such as Enterprise Resource Planning (ERP), Warehouse Management Systems (WMS), and fleet tracking platforms can achieve higher visibility and control across their supply chains. Additionally, integrating sustainability practices such as green transportation and energy-efficient warehouses can further improve efficiency while aligning with global environmental standards. In the Kenyan brewing sector, efficient physical distribution practices are especially important given the reliance on returnable bottles and crates, which require well-structured reverse logistics systems. By strengthening distribution processes, breweries can reduce losses from breakages, improve asset utilization, and enhance relationships with distributors and retailers.

Similarly, 98(76.5%) of the respondents agreed that inventory and warehousing practices enhance supply chain responsiveness while 24(18.8%) disagreed that inventory and warehousing practices enhance supply chain responsiveness. The mean of 3.86 indicates that the respondents agreed that inventory and warehousing practices enhance supply chain responsiveness while the standard deviation of 1.26, being below 2, showed that a few respondents deviated from the mean of 3.86. The study findings align with Gitau, (2016) discovered an elevated correlation between inventory management practices and operational performance, as evidenced by a significance level of 0.033, below the acceptable 0.05 threshold for investigating the value level accounted for by the three independent variables of data communication technology, strategic supplier partnerships, and inventory management systems.

Further, 106(82.8%) of the respondents agreed that transport and order processing practices reduce delivery lead times and errors whereas 16(12.5%) disagreed that transport and order processing practices reduce delivery lead times and errors. The mean of 3.95 indicates that respondents agreed that transport and order processing practices reduce delivery lead times and errors. The standard deviation of 1.00, which is below 2, showed that responses were consistent with only a few deviations from the mean of 3.95. The results are in line with a study by Chung, Talluri, and Kovács (2018), which found that while 3PL replenishment risk is mostly attributable for a firm's order lead-time performance, border-crossing uncertainty has a greater impact on a firm's service level.

4.5 Reliability Analysis

A reliability test was performed to determine the reliability of the research instrument used. A cut-off alpha coefficient of 0.7, according to Ursachi et al., (2015), is adequate to demonstrate that the item scales are consistent and reliable. The coefficient of reliability was calculated and shown in Table 4.11 by estimating Cronbach's alpha value. Every aspect of the constructs used were extremely trustworthy, wi1th Cronbach alpha values more than 0.7, as validated by Roller (2020). The results further show that transport management practices had the highest reliability with a Cronbach's alpha of 0.842, followed by order processing practices with a Cronbach's alpha of 0.741, warehousing practices with a Cronbach's alpha of 0.732, inventory management practices with a Cronbach's alpha of 0.721 and logistics performance with a Cronbach's alpha of 0.718. These findings suggest that the measurement tools applied in this study were dependable and could be confidently used in further analysis.

Table 4. 11

Reliability Test Results

Variable	Number of items in the scale	Cronbach alpha
Transport management practice	3	.842
Warehousing practices	3	.732
Inventory management practices	3	.721
Order processing practices	3	.741
Logistic performance	3	.718

Source: Research Data 2025

4.6 Correlation Analysis

To demonstrate the direction and intensity of the relationship between the independent and dependent variables, a Pearson correlation analysis was carried out. The degree of correlation between the study's variables and the significance of the linear relationship between them in the regression ranges between +1 and -1, respectively, were measured using Pearson's product-moment correlation coefficient (r). A very strong relationship is indicated by r=+0.7 and above, a strong link by r=+0.5 to below 0.7, a moderate relationship by r=+0.3 to +0.49, and a weak relationship by r=.029 and below. No association is there when r = 0 (Cohen, Cohen, and Aiken, 2003). The results are shown in Table 4.12.

Table 4.12

Correlation Coefficient Matrix

		Logistics Performance	Transport Management Practices	Warehousing Practices	Inventory Management Practices	Order Processing Practices

Logistics Performance	Pearson Correlation	1				
	Sig.					
Transport Management Practices	Pearson Correlation	.757**	1			
	Sig.	.000				
Warehousing Practices	Pearson Correlation	.779**	.761**	1		
	Sig.	.000	.000			
Inventory Management Practices	Pearson Correlation	.734**	.679**	.757**	1	
	Sig.	.000	.000	.000		
Order Processing Practices	Pearson Correlation	.795**	.761**	.797**	.730**	1
	Sig.	.000	.000	.000	.000	

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Source: *Research Data 2025*

Correlation results showed in Table 4.12 that there was a positive and statistically significant correlation between transportation management practices and logistics performance in the Kenyan brewing industry ($r=0.757$, $p<0.01$). The findings of the study indicate a strong, positive and statistically significant correlation between warehousing practice and logistics performance in the Kenyan brewing industry ($r=0.779$; $p<0.01$). The study established that there exist a strong, positive and statistically correlation between inventory management practice and logistics performance in the Kenyan brewing industry ($r=0.734$; $p<0.01$). The study further established that there exist a positive and statistically correlation between order processing practices and logistics performance in the Kenyan brewing industry ($r=.795$; $p<0.01$).

4.7 Multiple Regression Analysis

The research used multiple linear regression analysis to determine the linear statistical relationship between the independent variables and dependent variable.

4.7.1 Model Summary

The correlation coefficient (R) indicated the strength of the relationship between the dependent and independent variables, while the coefficient of determination (R2) indicated the proportion of variation in the dependent variable that can be predicted from the independent variable. The findings in Table 4.13 demonstrate how well the regression model explained the occurrences under investigation.

Table 4.13

Multiple Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.852[a]	.726	.717	.56180

Source: Research Data 2024

The results of the simple linear regression in Table 4.13 indicated that $R = 0.852$ and $R^2 = 0.726$. R value gives an indication that there is a strong linear relationship between physical distribution practices and logistics performance in the Kenyan brewing industry. The R^2 indicates that explanatory power of the independent variables is 0.726. This means that about 72.6% of the variation in logistics performance in the Kenyan brewing industry is explained by the regression model.

4.7.2 Model Fitness

To determine whether the model best fit the data, model fitness was performed. Table 4.14 displayed the study's findings.

Table 4.14

Regression Model Fitness Results

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Regression	103.062	4	25.766	81.635	.000b
Residual	38.821	123	.316		
Total	141.883	127			

Source: Research Data 2025

The model's fitness was confirmed by the F-statistics generated from Table 4.14 ($F = 81.635$), which also showed a significant $p = 0.000$. Thus, in the Kenyan brewing business, there is a statistically significant correlation between logistics performance and physical distribution patterns. The entire regression is significant because the F value shows that the variables in the equation are significant.

4.7.3 Hypotheses Testing for direct effect

To employ in the regression equation, regression model coefficients were run. Table 4.15 displays the study's findings.

Table 4.15 Regression Analysis Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.544	.141		3.869	.000
Transport Management Practices	.203	.070	.230	2.889	.005
Warehousing Practices	.199	.086	.211	2.315	.022
Inventory Management Practices	.169	.069	.189	2.453	.016
Order Processing Practices	.320	.090	.314	3.572	.001

Source: Research Data 2025

Results of coefficient regression in Table 4.15 showed that transport management practice has a positive and significant influence on logistics performance in the Kenyan brewing industry (β_1=0. 241, p=0.007). It was further established that warehousing practice has a positive and significant influence on logistics performance in the Kenyan brewing industry (β_2=0.274, p=0.004). Inventory management practice were found to have a positive and significant influence on logistics performance in the Kenyan brewing industry (β_3=0.253, p=0.002). Finally, order processing practices was found to have a positive and significant influence on logistics performance in the Kenyan brewing industry (β_4=0.216, p=0.010). Therefore, the overall regression results imply that there is a positive and significant relationship between independent variables and employee retention. The regression model is as follows,

$$Y = 0.544^* + 0.203X_1 + 0.199X_2 + 0.734X_3 + 0.795X_4 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad \text{Equation 4.1}$$

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

The main conclusions of the study on how physical distribution practices affect logistics performance in the Kenyan brewing sector are outlined in this chapter. It makes inferences from the analysis in Chapter Four and offers practical suggestions for brewing industry participants, especially Summit Lager Ltd., Keroche Breweries and Kenya Breweries Limited. Along with outlining the study's shortcomings, the chapter makes recommendations for future research directions.

5.2 Summary of Findings

The study looked into how logistics performance in the Kenyan brewing industry was affected by four physical distribution practices: transportation management, warehousing, inventory management, and order processing.

5.2.1 Transport Management Practices

The first specific objective of the study was to assess the effect of transportation management practices on logistics performance in the Kenyan brewing industry. Based on the results of the study, transport management practices are moderately embedded in the Kenyan brewing industry with an overall average of 3.68 (SD = 1.31). The study found that respondents agreed that transport planning strategies optimize delivery routes. Chadalawada (2024) also concurred that indicators such as cost and delivery hours have been regularly used to evaluate transport performance. Furthermore, participants indicated that transport management practices were linked to improved logistics performance, as a whole these findings suggest that transportation management practices are significant indicators of logistics performance in the beverage industry ($\beta1=0.203$: $p<0.05$).

5.2.2 Warehousing Practices

The second specific objective of the study was to assess the role of warehousing management in optimizing logistics performance in the Kenyan brewing industry. Warehousing practices exhibited a high level of implementation in our survey with an overall mean of 3.61 (SD = 1.29). The study found that respondents agreed that warehouse layout and design support efficient storage and retrieval. Genevieve and Akumuntu (2024) also agreed that warehousing practices contribute to timely order fulfillment. In addition, respondents acknowledged that they face warehousing challenges such as space constraints and outdated equipment. Collectively, these results indicate that while warehousing practices positively influence logistics performance, existing challenges limit their full effectiveness ($\beta_2=0.199$: $p<0.05$).

5.2.3 Inventory Management Practices

The third specific objective of the study was to determine the effect of inventory management practices on logistics performance in the Kenyan brewing industry. The overall mean rating for inventory management practices was 3.70 (SD = 1.31). The study found that respondents agreed together with Jean (2024) that inventory tracking systems support stock accuracy, demand forecasting is applied to plan inventory levels, and inventory practices help reduce both stock outs and excess inventory. Overall, the findings suggest that inventory management practices have a positive influence on logistics performance by enhancing accuracy, planning, and efficiency in stock control ($\beta_3=0.169$: $p<0.05$).

5.2.4 Order Processing Practices

The fourth specific objective of the study was to examine the effect of order processing practices on logistics performance in the Kenyan brewing industry. Order processing practices had an overall score of 3.69 (SD = 1.31). The findings revealed that respondents agreed customer orders are processed accurately and on time, order processing systems support real-time tracking and confirmations, and efficient order processing enhances customer satisfaction. Overall, the results indicate that order processing practices positively influence logistics performance by improving accuracy, speed, transparency, and customer service ($\beta_4 = 0.320$: $p<0.05$). also in agreement with Sebata, (2024 who Investigated how logistics operations affect an organization's financial performance.

5.3 Conclusion

5.3.1 Transport Management Practices

Transport management practices are moderately adopted in the Kenyan brewing industry but have a very strong negative relationship with logistics performance. This indicates that practices currently in place, such as route optimization and performance measurement, are not having a positive impact on logistics outcomes. This may be due to external variables, such as poor infrastructure, or internal variables, such as ineffective fleet management. It is essential to resolve the challenges mentioned to improve logistics performance. Transportation practices are perceived as reliable, but their impact on logistics performance is deterred. Organizations must enhance execution, utilize technology, and address external infrastructure issues for effective transportation management.

5.3.2 Warehousing Practices

Warehousing practices have an almost perfect positive relationship with logistics performance in the Kenyan brewing industry, and play a key role in logistics performance. Efficient warehouse design and prompt order fulfilment greatly improve supply chain responsiveness, thus strategically developing a strength in the warehousing area of the supply chain. Some challenges still need to be overcome such as limited warehouse space and aged equipment to sustain and increase these benefits. Warehousing is a crucial distribution practice that requires significant investments in modernization, layout, and capacity improvements to enhance logistics performance.

5.3.3 Inventory Management Practices

Despite successful adoption of inventory management practices in general, including demand forecasting, their very strong negative correlation with logistics performance indicates that there some very inefficient use of practices. Composition of a variety of tracking systems and forecasting errors could mean compromised logistics results. A good review of the inventory management practices is warranted to ensure all inventory management technology is in line with the performance goals. Although inventory management processes can be trusted, they tend to be less consistent and effective due to varied utilization of tracking. Better alignment and advanced technologies can better utilize inventory management processes for logistics purposes.

5.3.4 Order Processing Practices

The order processing practices show to be moderately effective with a strong relationship to customer satisfaction, but their also strong negative correlation to logistics performance suggests inefficiencies (errors or delays) are present – this compromises customer satisfaction, and that is huge in an industry, such as brewing, where delivery is very important in maintaining customer relations. Order processing systems need improvement for logistics satisfaction to improve customer satisfaction. Essentially, order processing predicts customer satisfaction, but its weak correlation with logistics performance suggests efficiency is lacking. Implementing streamlined, technology-driven order management systems could improve performance outcomes.

5.4 Recommendation

The following suggestions are put forth to improve logistics performance in the Kenyan brewing industry in light of the findings and conclusions:

5.4.1 Invest in Advanced Transportation Management Systems

To standardize and improve delivery efficiency, brewing companies should implement advanced transport planning tools, such as route optimization software (Nettesheim, 2024). Consistency in transport management can be further enhanced by regular training on key performance indicators (KPIs) for delivery time and cost.

5.4.2 Upgrade Warehousing Infrastructure

Businesses should make investments in cutting-edge technologies like automated systems for storage and retrieval, as well as expand capacity or create layouts that maximize available space (Torchio, 2023). These upgrades will lessen difficulties and increase the effectiveness of order fulfillment.

5.4.3 Standardize Inventory Tracking Systems

To lower variability and increase stock accuracy, businesses should deploy automated inventory tracking systems in every department. Stock outs and excess inventory can be reduced and inventory levels further optimized by integrating these systems with demand forecasting tools (Verma, 2024).

5.4.4 Increase Order Processing Automation

Businesses should spend money on automated order processing systems with real-time tracking features to deal with sporadic mistakes and delays. Customer satisfaction will increase and consistency will be guaranteed by standardizing procedures and training staff.

5.4.5 Adopt an Integrated Supply Chain Approach

To guarantee the smooth integration of physical distribution procedures, brewing companies should encourage cooperation between the marketing, logistics, and management departments. The overall logistics performance and supply chain responsiveness will be improved by this all-encompassing strategy.

5.4.6 Continuous Monitoring and Evaluation

Businesses should set up routine monitoring systems to use KPIs to evaluate how well distribution strategies are working. Frequent evaluations will support ongoing logistics performance improvement by pointing out gaps.

5.5 Limitation of the Study

This research had some limitations that should be considered. First, it was limited to three brewing companies and it is doubtful that these companies encapsulated the overall brewing space in Kenya. As a result, the findings may not be analogous to the breweries operating in the Kenyan brewing space today. Second, data was dependent on the questionnaire supplied by participants, which could lead to bias. Inherent constraints could lead participants to over- or underestimate the effectiveness of its distribution strategies. Third, the study not only relied on descriptive statistics, but it sought to ascertain the extent that identified variables caused logistics performance. One logistical performance indicator has been explored further could have led to richer qualitative data concerning the research findings. Fourth, as was specifically requested, time constraints brought full development of longitudinal logistics performance into question. Had time permitted, observing logistics performance over a long period could provide useful perspective for the research. Last, the study had also identified negative correlations for some components in transport, inventory, and order processing practices. This study did not pursue qualitative data to determine a logical explanation for the negative findings. Thus, further study is required to uncover the reasons for the previously unidentified components in the research that are correlated negatively.

5.6 Recommendation for Further study.

The Kenyan brewing sector needs to improve logistics performance by standardizing and optimizing delivery activities, investing in modern technology, and implementing sustainable practices. The study suggests using transportation management systems, updating warehouse infrastructure, investigating causal relationships, conducting a longitudinal study, and utilizing emerging technologies like block chain and AI.

Transportation management systems can streamline delivery routes, save costs, and increase delivery time, while warehouse infrastructure should be updated to improve efficiency. Investing in automatic storage and retrieval systems can enhance fulfillment speed and precision, hence a supply chain's responsiveness.

Understanding the causal pathways linking physical distribution practices and logistics performance can assist in overcoming barriers to performance. A longitudinal study can assess the long-term impacts of physical distribution practices on logistics performance, enable dynamic viewpoints of how these practices progress and the continued impacts in the brewing industry.

New technologies like block chain and AI can create more transparent and traceable supply chains while AI can help forecast stock levels and reduce inefficiencies. These recommendations provide a pathway to improve logistics efficiency in the Kenyan brewing industry while considering sustainable objectives and implications for public universities pursuing green procurement objectives.

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Appendix I: Research Questionnaires

Instructions

1. Leave your name blank throughout this survey.

2. For each statement or question, only select [] one response.

3. Please respond truthfully and completely to each question.

General Data

i. Please select your gender.

Male [] Female []

ii. Indicate your level of education.

Secondary [] College [] Undergraduate [] Post Graduate []

iii. What is your role within the brewery firm?

Logistics Officer [] Marketing Officers [] Management Staff []

iv. For how long has your company been brewing?

Less than 1 year [] 1-3 years [] 4-6 years [] More than 6 years []

Questionnaire: Physical Distribution Practices and Logistics Performance

Section B: Transport Management Practices

Qn No.	Item Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
s1	Our company utilizes transport planning strategies to optimize delivery routes.	☐	☐	☐	☐	☐
s2	Transport performance is measured using indicators like delivery time and cost.	☐	☐	☐	☐	☐
s3	Transport management practices have improved our logistics performance.	☐	☐	☐	☐	☐

Section C: Warehousing Practices

Qn No.	Item Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
s1	Our warehouse layout and design support efficient storage and retrieval.	☐	☐	☐	☐	☐
s2	Warehousing practices contribute to timely order fulfillment.	☐	☐	☐	☐	
s3	We face warehousing challenges such as space constraints or outdated equipment.	☐	☐	☐	☐	☐

Section D: Inventory Management Practices

Qn No.	Item Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
s1	We use inventory tracking systems to maintain stock accuracy.	☐	☐	☐	☐	☐
s2	Demand forecasting is used to plan inventory levels.	☐	☐	☐	☐	☐
s3	Our inventory management practices reduce stock outs and excess inventory.	☐	☐	☐	☐	☐

Section E: Order Processing Practices

Qn No.	Item Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
s1	Customer orders are processed accurately and on time.	☐	☐	☐	☐	☐
s2	Our order processing system supports real-time tracking and confirmations.	☐	☐	☐	☐	☐
s3	Efficient order processing has helped improve our customer satisfaction.	☐	☐	☐	☐	☐

Section F: Logistics Performance

Qn No.	Item Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
e1	Our physical distribution practices have improved overall logistics performance.	☐	☐	☐	☐	☐
e2	Inventory and warehousing practices enhance supply chain responsiveness.	☐	☐	☐	☐	☐
e3	Transport and order processing practices reduce delivery lead times and errors.	☐	☐	☐	☐	☐

Your time is greatly appreciated in completing the survey! Your input is very important to understand the impact of physical distribution practices on logistics performance in the Kenya brewing industry.